

Levant Supplementary Series 11

THE LATER PREHISTORY OF THE BADIA

EXCAVATIONS AND SURVEYS IN EASTERN JORDAN: VOLUME 2



by

A. V. G. Betts

and

D. Cropper, L. Martin and C. McCartney

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with contributions by

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F. Matsaert, H. Pessin, D. Reese and G. Willcox*

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2. The landscape of the eastern *hamad*
by Alison Betts

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Contents

List of figures

List of tables

List of plates

Abstract

Preface

- 1 Background and Methodology
A. Betts, L. Martin and C. McCartney
- 2 Late Neolithic Sites in the *Harra*
A. Betts, L. Cooke, A. Garrard, C. McCartney and D. Reese
- 3 Prehistoric Sites at Burqu'
A. Betts, L. Martin, E. Matsuert and C. McCartney
- 4 Excavations at Mahfour al-Ruweishid
A. Betts, C. McCartney, H. Pessin and G. Willcox
- 5 Excavations at Tell al-Hibr
A. Betts and L. Martin
- 6 Area Survey in the *Hamad*
A. Betts, D. Cropper and W and E Lancaster
- 7 The Eastern *Badia*
A. Betts and D. Cropper

Bibliography

Index

Plates

List of figures

- Figure 1.1 Badiyat al-Sham
Figure 1.2 Eastern Jordan: excavated sites
Figure 2.1 Late Neolithic sites in the western *harra*
Figure 2.2 Jebel Naja: site location map
Figure 2.3 Jebel Naja: site plan
Figure 2.4 Jebel Naja: trench 400, plan and section
Figure 2.5 Jebel Naja: chipped stone
Figure 2.6 Jebel Naja: chipped stone
Figure 2.7 Jebel Naja: chipped stone
Figure 2.8 Jebel Naja: chipped stone
Figure 2.9 Jebel Naja: chipped stone
Figure 2.10 Jebel Naja: suggested techniques for bead making
Figure 2.11 Jebel Naja: complete beads
Figure 2.12 Jebel Qunna: site location map
Figure 2.13 Jebel Qunna: chipped stone
Figure 2.14 Jebel Qunna: chipped stone
Figure 2.15 Qa' Muqalla: site location map
Figure 2.16 Qa' Muqalla: chipped stone
Figure 2.17 Qa' Muqalla: chipped stone
Figure 2.18 Qa' Muqalla: chipped stone
Figure 2.19 Wadi Selahib: site location map
Figure 2.20 Jibal al-Qattafi: site location map
Figure 2.21 Jibal al-Qattafi: chipped stone
Figure 2.22 Qa' Naja West: site location map
Figure 2.23 Qa' Naja East: site location map
Figure 2.24 Jibal al-Qattafi, Qa' Naja: chipped stone
Figure 2.25 Wadi Qattafi: site location map
Figure 2.26 Qa' Naja: chipped stone
Figure 2.27 Qa' Naja: chipped stone
Figure 2.28 Qa' Naja: chipped stone
Figure 2.29 Al-Ghirqa: site location map
Figure 2.30 Al-Ghirqa: 2329 site plan
Figure 2.31 Al-Ghirqa: chipped stone
Figure 3.1 Burqu': site location map

Figure 3.2 Burqu' 03000: general site plan
Figure 3.3 Burqu' 03000: sections
Figure 3.4 Burqu' 03000: schematic sections showing construction techniques
Figure 3.5 Burqu' 03000: special finds. Stone ring fragments
Figure 3.6 Burqu' 03000: stone beads and blanks
Figure 3.7 Burqu' 03000: ground stone
Figure 3.8 Burqu' 03000: ground stone
Figure 3.9 Burqu' 03000: ground stone
Figure 3.10 Burqu' 03000: chipped stone
Figure 3.11 Burqu' 35000: plans and sections
Figure 3.12 Burqu' 35000: ground stone
Figure 3.13 Burqu' 35000: chipped stone
Figure 3.14 Burqu' 35000: chipped stone
Figure 3.15 Burqu' 35000: chipped stone
Figure 3.16 Burqu' 27000: plan – Phase 1
Figure 3.17 Burqu' 27000: plan – Phase 2
Figure 3.18 Burqu' 27000: plan – Phase 3
Figure 3.19 Burqu' 27000: plan – Phase 4
Figure 3.20 Burqu' 27000: plan – Phase 5
Figure 3.21 Burqu' 27000: special finds
Figure 3.22 Burqu' 27000: ground stone
Figure 3.23 Burqu' 27000: ground stone
Figure 3.24 Burqu' 27000: chipped stone
Figure 3.25 Burqu' 27000: chipped stone
Figure 3.26 Burqu' 27000: chipped stone
Figure 3.27 Burqu' 27000: chipped stone
Figure 3.28 Burqu' 11000: pre-excavation plan
Figure 3.29 Burqu' 11000: general site plan
Figure 3.30 Burqu' 11000: south section
Figure 3.31 Burqu' 11000: special finds
Figure 3.32 Burqu' 11000: ground stone
Figure 3.33 Burqu' 11000: chipped stone
Figure 3.34 Burqu' 11000: chipped stone
Figure 3.35 Burqu' 11000: chipped stone
Figure 3.36 Burqu' 11000: chipped stone
Figure 3.37 Burqu' 20000: plan and section
Figure 3.38 Burqu' 20000: ground stone
Figure 3.39 Burqu' 20000: chipped stone
Figure 3.40 Burqu' 02000: general plan
Figure 3.41 Burqu' 02000: 02300 grave
Figure 3.42 Burqu' 02000: 02100 plan and section
Figure 3.43 Burqu' 02000: chipped stone
Figure 3.44 Burqu' 02000: chipped stone
Figure 3.45 Burqu' 02000: chipped stone
Figure 3.46 Burqu' 18000: plan
Figure 3.47 Burqu' 18000: south section
Figure 3.48 Burqu' 18000: west section
Figure 3.49 Burqu' 18000: ground stone

Figure 3.50 Burqu' 18000: chipped stone
Figure 3.51 Burqu' 18000: chipped stone
Figure 3.52 Burqu' 28000: plan
Figure 3.53 Burqu' 29000: general plan after initial cleaning
Figure 3.54 Burqu' 29000: detail of covering of pit
Figure 3.55 Burqu' 29000: pit after excavation
Figure 4.1 Mahfour al-Ruweishid: general site plan
Figure 4.2 Mahfour al-Ruweishid: 100 Level 2 plan
Figure 4.3 Mahfour al-Ruweishid: 100 Level 3 plan
Figure 4.4 Mahfour al-Ruweishid: ground stone
Figure 4.5 Mahfour al-Ruweishid: chipped stone
Figure 4.6 Mahfour al-Ruweishid: chipped stone
Figure 5.1 Tell al-Hibr: site location map
Figure 5.2 Tell al-Hibr: plan of rock shelter
Figure 5.3 Tell al-Hibr: profiles of rock shelter
Figure 5.4 Tell al-Hibr: plans P1, P2
Figure 5.5 Tell al-Hibr: plans P3, P4
Figure 5.6 Tell al-Hibr: spear head 100/2
Figure 5.7 Tell al-Hibr: special finds
Figure 5.8 Tell al-Hibr: chipped stone
Figure 5.9 Tell al-Hibr: chipped stone
Figure 5.10 Tell al-Hibr: chipped stone
Figure 5.11 Tell al-Hibr: chipped stone
Figure 5.12 Tell al-Hibr: ceramics
Figure 6.1 Eastern *hamad*: location of survey sectors
Figure 6.2 89/12 stone corral
Figure 6.3 88/1016 desert mosque
Figure 6.4 88/1018 stone corral
Figure 6.5 88/1019 desert mosque
Figure 6.6 88/1019 desert mosque
Figure 6.7 88/1020: chipped stone
Figure 6.8 88/1020: chipped stone
Figure 6.9 RQ 1000 stone burial cairn
Figure 6.10 RQ 2000: chipped stone
Figure 6.11 Ruweishid as-Satih (RS) 2000 stone corrals
Figure 6.12 88/4001 Ahl al-Jebel grave
Figure 6.13 89/14 Ahl al-Jebel grave
Figure 6.14 89/18 Ahl al-Jebel grave
Figure 6.15 Ruweishid al-Qisb. Ahl al-Jebel graves
Figure 6.16 Section of graveyard at Burqu'
Figure 6.17 Wadi Jilat: abandoned beduin camp site
Figure 6.18 Wadi Jilat: abandoned beduin camp site
Figure 6.19 Qasr Burqu': abandoned beduin camp site
Figure 6.20 Wadi Jilat: abandoned beduin camp site
Figure 6.21 Burqu'. Desert police outpost
Figure 6.22 0000 desert mosque
Figure 6.23 0000 desert mosque
Figure 6.24 Burqu' 1400

Figure 7.1 Distribution of sites in the eastern *badia*: EMPPNB

Figure 7.2 Distribution of sites in the eastern *badia*: LPPNB

Figure 7.3 Distribution of sites in the eastern *badia*: ELN-LN

List of tables

Table 1.1	Site numbering: 1:50,000 map correlation table
Table 1.2	Radiocarbon determinations for the eastern <i>badia</i>
Table 1.3	Chronology of the Neolithic of the Near East
Table 2.1	Jebel Naja: contexts by phases
Table 2.2	Jebel Naja: special finds
Table 2.3	Jebel Naja: raw material quality
Table 2.4	Jebel Naja: cortex types
Table 2.5	Jebel Naja: total assemblage count
Table 2.6	Jebel Naja: artefact types - core reduction
Table 2.7	Jebel Naja: blank type utilization
Table 2.8	Jebel Naja: core types
Table 2.9	Jebel Naja: butt types
Table 2.10	Jebel Naja: dorsal scar patterns
Table 2.11	Jebel Naja: major tool groups
Table 2.12	Jebel Naja: retouched pieces
Table 2.13	Jebel Naja beads: complete beads
Table 2.14	Survey sites: tool types: absolute counts
Table 3.1	Burqu' 03000: site concordance
Table 3.2	Burqu' 03000: contexts by phases
Table 3.3	Burqu' 03000: special finds
Table 3.4	Burqu' 03000: raw material quality
Table 3.5	Burqu' 03000: cortex types
Table 3.6	Burqu' 03000: total assemblage count
Table 3.7	Burqu' 03000: artefact types - core reduction
Table 3.8	Burqu' 03000: blank type utilization
Table 3.9	Burqu' 03000: core types
Table 3.10	Burqu' 03000: butt types
Table 3.11	Burqu' 03000: dorsal scar patterns
Table 3.12	Burqu' 03000: major tool groups: absolute and relative counts
Table 3.13	Burqu' 03000: tool types: absolute counts by phase
Table 3.14	Burqu' 03000: identifiable v. non-identifiable animal bones by phase
Table 3.15a	Burqu' 03000: animal remains (NISPs per phase of occupation)
Table 3.15b	Burqu' 03000: relative proportions of taxa (all phases combined)
Table 3.16	Burqu' 35000: contexts by phases

Table 3.17 Burqu' 35000: special finds

Table 3.18 Burqu' 35000: raw material quality

Table 3.19 Burqu' 35000: cortex types

Table 3.20 Burqu' 35000: total assemblage count

Table 3.21 Burqu' 35000: artefact types - core reduction

Table 3.22 Burqu' 35000: blank type utilization

Table 3.23 Burqu' 35000: core types

Table 3.24 Burqu' 35000: butt types

Table 3.25 Burqu' 35000: dorsal scar pattern

Table 3.26 Burqu' 35000: major tool groups: absolute and relative counts

Table 3.27 Burqu' 35000: tool types: absolute counts by phase

Table 3.28 Burqu' 35000: identifiable v. unidentifiable animal bones separated by context

Table 3.29 Burqu' 35000: identifiable animal remains (NISPs per phase of occupation)

Table 3.30 Burqu' 35000: taphonomic information for contexts

Table 3.31 Burqu' 27000: contexts by phases

Table 3.32 Burqu' 27000: special finds

Table 3.33 Burqu' 27000: raw material quality

Table 3.34 Burqu' 27000: cortex types

Table 3.35 Burqu' 27000: total assemblage count

Table 3.36 Burqu' 27000: artefact types - core reduction

Table 3.37 Burqu' 27000: blank type utilization

Table 3.38 Burqu' 27000: core types

Table 3.39 Burqu' 27000: butt types

Table 3.40 Burqu' 27000: dorsal scar patterns

Table 3.41 Burqu' 27000: major tool groups: absolute and relative counts

Table 3.42 Burqu' 27000: tool types: absolute counts by phase

Table 3.43 Burqu' 27000: identifiable v. unidentifiable animal bones by phase

Table 3.44 Burqu' 27000: identifiable animal remains (NISPs per phase of occupation)

Table 3.45 Burqu' 11000: contexts by phases

Table 3.46 Burqu' 11000: special finds

Table 3.47 Burqu' 11000: raw material quality

Table 3.48 Burqu' 11000: cortex types

Table 3.49 Burqu' 11000: total assemblage count

Table 3.50 Burqu' 11000: artefact types - core reduction

Table 3.51 Burqu' 11000: blank type utilization

Table 3.52 Burqu' 11000: core types

Table 3.53 Burqu' 11000: butt types

Table 3.54 Burqu' 11000: dorsal scar pattern

Table 3.55 Burqu' 11000: major tool groups: absolute and relative counts

Table 3.56 Burqu' 11000: tool types: absolute counts by phase

Table 3.57 Burqu' 11000: weights of identifiable v. non-identifiable

Table 3.58 Burqu' 11000: identifiable animal remains (NISPs per phase of occupation)

Table 3.59 Burqu' 20000: contexts by phases

Table 3.60 Burqu' 20000: special finds

Table 3.61 Burqu' 20000: raw material quality

Table 3.62 Burqu' 20000: cortex types

Table 3.63 Burqu' 20000: total assemblage counts

Table 3.64 Burqu' 20000: artefact types - core reduction

Table 3.65 Burqu' 20000: blank type utilization

Table 3.66 Burqu' 20000: core types

Table 3.67 Burqu' 20000: butt types

Table 3.68 Burqu' 20000: dorsal scar patterns

Table 3.69 Burqu' 20000: major tool groups: absolute and relative counts

Table 3.70 Burqu' 20000: tool types: absolute counts by phase

Table 3.71 Burqu' 20000: identifiable animal remains (NISPs per phase of occupation)

Table 3.72 Burqu' 02000: contexts by phases

Table 3.73 Burqu' 02000: special finds

Table 3.74 Burqu' 02000: raw material quality

Table 3.75 Burqu' 02000: cortex types

Table 3.76 Burqu' 02000: total assemblage count

Table 3.77 Burqu' 02000: artefact types - core reduction

Table 3.78 Burqu' 02000: blank type utilization

Table 3.79 Burqu' 02000: core types

Table 3.80 Burqu' 02000: butt types

Table 3.81 Burqu' 02000: dorsal scar pattern

Table 3.82 Burqu' 02000: major tool groups: absolute and relative counts

Table 3.83 Burqu' 02000: tool types: absolute counts by phase

Table 3.84 Burqu' 02000: identifiable animal remains (NISPs per phase of occupation)

Table 3.85 Burqu' 18000: contexts by phase

Table 3.86 Burqu' 18000: special finds

Table 3.87 Burqu' 18000: raw material quality

Table 3.88 Burqu' 18000: cortex types

Table 3.89 Burqu' 18000: total assemblage count

Table 3.90 Burqu' 18000: artefact types - core reduction

Table 3.91 Burqu' 18000: blank type utilization

Table 3.92 Burqu' 18000: core types

Table 3.93 Burqu' 18000: butt types

Table 3.94 Burqu' 18000: dorsal scar patterns

Table 3.95 Burqu' 18000: major tool groups: absolute and relative counts

Table 3.96 Burqu' 18000: tool types: absolute counts by phase

Table 3.97 Burqu' 18000: counts and weights of identifiable v. unidentifiable animal bones by phase

Table 3.98 Burqu' 18000: identifiable animal remains (NISPs per phase of occupation)

Table 3.99 Burqu' 18000: relative proportions of all taxa (% NISP)

Table 3.100 Burqu': sites and contexts from which charcoal was extracted for botanical analysis

Table 3.101 Burqu' sites: identified botanical samples from charcoals

Table 4.1 Mahfour al-Ruweishid: contexts by level

Table 4.2 Mahfour al-Ruweishid: raw material quality

Table 4.3 Mahfour al-Ruweishid: cortex types
Table 4.4 Mahfour al-Ruweishid: total assemblage count
Table 4.5 Mahfour al-Ruweishid: artefact types - core reduction
Table 4.6 Mahfour al-Ruweishid: blank type utilization
Table 4.7 Mahfour al-Ruweishid: core types
Table 4.8 Mahfour al-Ruweishid: butt types
Table 4.9 Mahfour al-Ruweishid: dorsal scar patterns
Table 4.10 Mahfour al-Ruweishid: major tool groups
Table 4.11 Mahfour al-Ruweishid: retouched pieces
Table 5.1 Tell al-Hibr: contexts by level
Table 5.2 Tell al-Hibr: special finds
Table 5.3 Tell al-Hibr: distribution of ostrich eggshell by level
Table 5.4 Tell al-Hibr: chipped stone. Total assemblage count
Table 5.5 Tell al-Hibr: chipped stone. Retouched pieces
Table 5.6 Tell al-Hibr: sherd frequency matrix
Table 5.7 Tell al-Hibr: diagnostic ceramics
Table 5.8 Tell al-Hibr: absolute numbers of all taxa (Stage 1)
Table 5.9 Tell al-Hibr: preservation condition of animal remains (Stage 1)
Table 6.1 Ruweishid al-Qusb (RQ) flood plain: finds from abandoned camp sites
Table 7.1 Summary of selected animal bone data from sites in the eastern *badia*

List of plates

- Plate 1 Qasr Burqu'
- Plate 2 The expedition camp
- Plate 3 Beduin collecting water at the Burqu' lake
- Plate 4 The Burqu' ruin field, showing the Qasr and prehistoric sites
- Plate 5 Pre-modern corrals above the western shore of the lake
- Plate 6 Detail of walls at Site 03000 after excavation
- Plate 7 Site 27000 after initial clearing of rubble
- Plate 8 Site 11000 after excavation
- Plate 9 Site 28000 after excavation
- Plate 10 Recent graves at Burqu'
- Plate 11 Mahfour al-Ruweishid before excavation
- Plate 12 Mahfour al-Ruweishid: corral wall during excavation
- Plate 13 Mahfour al-Ruweishid: interior after excavation
- Plate 14 Mahfour al-Ruweishid: hearth on bedrock
- Plate 15 Tell al-Hibr: entrance to rock shelter
- Plate 16 Ahl al-Jebel grave in the *harra*
- Plate 17 Ahl al-Jebel grave in the *hamad*
- Plate 18 Ahl al-Jebel grave showing items left on grave
- Plate 19 Hollow stone near Ahl al-Jebel grave
- Plate 20 Stone 'coffee hearth' near AM al-Jebel grave
- Plate 21 Ahl al-Jebel grave in the *hamad*
- Plate 22 Ahl al-Jebel grave in the *harra*
- Plate 23 Toy tent
- Plate 24 Desert mosque
- Plate 25 Desert mosque
- Plate 26 Desert mosque
- Plate 27 RQ 1000 stone burial cairn
- Plate 28 RQ: partially blocked rock shelter in cliff
- Plate 29 Early stone corral in the *hamad*
- Plate 30 RQ: collection of material from recently abandoned camp sites

Abstract

The Jordanian *badia* north and east of the oasis of alAzraq is an arid region divided into two distinct zones. In the west lies the black, boulder-strewn landscape of the *harra*; to the east the low rolling gravel plains of the *hamad*. Extreme climate has largely protected the region from modern development and has preserved a remarkably rich record of its prehistoric past. This is the second of two volumes to document extensive surveys and excavations in the region from Al-Azraq to the Iraqi border over the period 1979–1996. Broadly, it covers the Late Neolithic and Chalcolithic of the eastern *badia*, including surveys in the *harra*, excavations at a number of sites at Burqu' and extensive surveys of sites of all periods in the eastern *hamad*. The rich prehistoric record preserved in the east Jordanian *badia* was first brought to the attention of western scholars through casual discoveries by RAF pilots flying along the old air route to Baghdad, and through surveys carried out by Henry Field in the period from 1925 to 1950. The region then remained unstudied until the 1970s, when Garrard and Stanley-Price undertook further survey work in the Azraq Oasis. This was followed by the surveys and excavations documented in this series.

Over time an outline prehistory of the region has emerged. Late Epi-Palaeolithic camp sites have been found in the north-west of the *harra* in the foothills of Jebel Druze, while the central basalt region saw a flourish of activity in the late Aceramic Neolithic, when it was used extensively for hunting. This volume covers the following period, which witnessed a further spread of campsites and short-term occupation out around the edges of the *harra* and across the *hamad* as far as the lands bordering the Euphrates to the north and east. This period was marked by the first appearance of sheep and goat as one element of the steppic economy alongside traditional practices of hunting and foraging. The concluding chapter discusses these changes and proposes models for the introduction of domesticated animals into the steppe as a precursor to a full nomadic pastoral economy.

Preface

This volume is the second in a series covering fieldwork in eastern Jordan from 1979 to 1996. Material has been gathered and collated in the course of a wide variety of research programmes involving a large number of people in Jordan, the United Kingdom, Australia and elsewhere. Many of these have been acknowledged in the preface to Volume I (Betts *et al.* 1998, xix) and perhaps they will forgive me if I do not list them all exhaustively again here. However, I would like to express again my thanks to the staff of the Department of Antiquities of Jordan, in particular Directors General Dr Ghazi Bisheh, Dr Adnan Hadidi and Dr Safwan Tell. I would also like to thank our field representatives. Most of the material covered in this volume has been collected while working with Mr Khaled al-Jbour of the Mafraq office, whom I cannot thank enough for his constant help, support and good humour. Specific sections of the volume have benefited from the work of former students. Carole McCartney and Frank Matsuert were responsible for the excavation of and preparation of reports on two of the sites. Carole has also undertaken the technological analyses of the excavated lithic assemblages. Dawn Cropper assisted with lithic analysis of surface collections and preparation of illustrations, and has contributed to the discussion and conclusions. I would also like to acknowledge the valuable advice offered by two anonymous reviewers, whose insights have helped me to fill in significant gaps in the draft manuscript that I was not able to see for myself.

Conditions in-field at Qasr Burqu' were particularly difficult. The climate was extreme, the water supply limited and the living conditions absolutely basic. The site is located over 350km from Amman, close to the borders with Syria, Iraq and Saudi Arabia. The Amman-Baghdad Highway, and in particular the section between Mafraq and Ruweishid, was at that time one of the most dangerous roads in the region. The site lies about 15km from the highway, is invisible at more than a kilometre away and is impossible to find safely at night. Rain turned the tracks into a virtually impassable clay quagmire and in dry weather the road was beset by clouds of thick dust. The region at that time lay beyond the effective control of Jordanian authorities, although the *Badia* Police Force had nominal jurisdiction over it. It was populated by armed beduin, smugglers and itinerant hunters. It was only through the kindness and protection of the Sheiks of the Sha'alán that we were able to carry out our work there in safety, and to them I am most grateful indeed. A number of beduin camping around the lake and in the *hamad* helped and

supported us, as did those drivers on the highway who unquestioningly offered assistance on the many occasions that our vehicles broke down. I am also extremely grateful to all those who trusted me enough to work there and who uncomplainingly put up with the difficulties they faced. I hope they feel that the experience and the success of the results justified it. Since this volume contains the results of work from several different projects, I have listed here staff from all field seasons in alphabetical order: Ali Balcaz, Dominic Best, Alison Bowden, Rachel Burch, Kirsty Cameron, David (Rat) Connolly, Alex Creswell, Cliff Denham, Joseph Dortch, Alvarro Figviero, George Findlater, John Grey, Svend Helms, Brian Hitchcock, Evan Jones, Derek Kennet, Fidelity Lancaster, William Lancaster, Alan Lupton, Carole McCartney, Catherine McLaughlin, Kirsten Macleod, Lucinda McLintock, Alison McQuitty, Louise Martin, Frank Matsaert, Rebecca Montague, Joseph Morgan, Constantine Politis, Anne Porter, Julia Rayner, Alison Reynolds, Isabelle Ruben, Madelene Sarley, Urs Schupp, Chris Steele, Ralph Troup, Michael Woods and Donna Yorkston.

Among the numerous institutions which have provided financial or other support, I would particularly like to mention, in relation to this volume, the British Institute at Amman for Archaeology and History, the British Academy, Edinburgh University, The Queen's University of Belfast and the University of Sydney. Volume I was concerned principally with the early prehistoric periods up to Pre-Pottery Neolithic B and, since much of the volume was devoted to the excavations at Dhuweila, it also included the Late Neolithic levels at the site. This volume generally, but not exclusively, covers the Late Neolithic and Chalcolithic/Early Bronze Age periods in the region, and consists mainly of material from The Black Desert Survey (1981–3) and the Burqu'/Ruweishid Project (1988–91), which was conducted while I was a British Academy Post-Doctoral Fellow at Edinburgh University.

Prior to the various research projects which I have carried out in eastern Jordan little was known of the prehistory of the region in the areas east of the oasis at al-Azraq. The only systematic recording had been carried out by Henry Field between 1925 and 1950 in the course of a series of traverses of the desert along the line of the RAF route to Baghdad (Field 1960). Analysis of his lithic collections by Dorothy Garrod provided the first clues to the wealth of the prehistoric record preserved in the eastern *badia*. In the absence of the two made-up roads which now traverse the region his work was carried out under particularly difficult conditions, and is all the more valuable for the effort it must have cost him. However, he did comment in his notes that he was frequently pleased when one of the vehicles broke down as it gave him the opportunity for further survey in a random location. His interest in the region never left him and in the early 1980s I was honoured to receive two letters from him expressing an interest in articles that I had written. He was kind enough to comment favourably on my work, while on each occasion politely reminding me that I had Jebel Um Wual in the wrong place on my maps. In acknowledgment of his work this volume is dedicated to Henry Field.

Note

This volume has been written over an extended period of time. The sections in Chapter 6 contributed by William and Fidelity Lancaster could not be updated

before the manuscript was completed. A number of other relevant publications have appeared subsequently and these are listed in the bibliography (Lancaster and Lancaster 1992; 1996; 1997; 1999).

1. Background and Methodology

A. Betts, L. Martin and C. McCartney

Introduction

The east Jordanian *badia* comprises the steppe lands on the fringes of, and beyond, the land viable for dry farming, broadly defined by the 200mm isohyet (Fig. 1.1). The country is sharply divided by the underlying geological formations into two distinct landscapes: the limestone *hamad*, a low rolling landscape of open gravel plains; and the *harra*, forbidding black boulder-strewn basalt uplands cut by deep wadis and punctuated by ancient volcanic peaks. The terrain of the *harra* is rough, rocky and has only two made-up roads crossing it, one of which is tarmac and the other packed gravel. Both of these, the Baghdad Highway and the Trans-Arabian Pipeline track (TAP Line), are almost completely straight, being in no serious way affected by the rough terrain they traverse. In addition, the interior of the *harra* is criss-crossed by numerous rough tracks cleared by beduin through the boulders to create access to grazing areas deep in the basalt. In addition to the Baghdad Highway, the open gravel plains of the *hamad* allow fairly easy access by vehicle, but the lack of water, the featureless nature of its landscape and the distances to be covered make fieldwork there hard, while in the *harra* the same problems of distance and limited water supply are complicated by the extremely rugged terrain, much of which can be traversed only on foot. Given these restrictions, the aim of much of the fieldwork in the region was to gain a general overview of site types and distribution through area survey, reinforced by detailed study of selected sites to clarify the nature of specific material culture assemblages. Work in the region was undertaken before the introduction of handheld GPS units.

Because of its environmental limitations, the *badia* was used almost exclusively by nomadic or semi-nomadic groups, and in order to begin to understand the nature of land use it is thus necessary to view the area from a regional perspective. It is also necessary to know the area through the changing seasons and to be aware of micro-climatic anomalies which are often to be recorded only through ground survey or local informants. The site distribution documented in this volume

reflects logistical expediency rather than a planned research strategy, and may not be representative of all sites that exist. The choice of survey areas was governed by a range of variables which included basic requirements such as vehicular access to a region and a camp water supply from modern drilled wells. Some more directed sampling included the deliberate selection of areas which might be of specific interest: prominent hills, ancient water sources, natural routes and so forth. Sites in the *harra* more than a half-day's walk from a track could not be recorded, but some tracks lead deep into the basalt and so the deep interior has been at least partially explored, and many sites are relatively easily accessible from the two roads which cut directly through the region regardless of natural routes, water sources or features in the landscape. Most sites have been recorded only on the basis of surface survey. However, the deflated nature of the sites, and the fact that they have lain undisturbed by any recent activity, permits the recovery of a representative sample of artefacts; and the consistent nature of most of the surface collections indicates that lack of excavation is not a serious barrier to establishing a broad pattern of site types and distribution.

The aim of the various fieldwork projects that have provided data for this volume was to investigate an area known to be rich in archaeological evidence from the prehistoric periods, about which tantalizingly little was known. As fieldwork progressed – from a nine-day preliminary visit in 1979 through three major programmes of survey and excavation – new discoveries raised as many questions as they solved. The previous volume (Betts *et al.* 1998) outlined the evidence for the Epi-Palaeolithic and detailed excavations at the Neolithic site of Dhuweila, including the association of this site with the desert ‘kites’ and their use as hunting traps. Investigation of the desert Neolithic showed that in the Pre-Pottery Neolithic B (PPNB) period, while large agricultural villages were growing up in the verdant lands to the west, the eastern *badia*, specifically the broken and rocky landscape of the *harra*, was populated for part, if not all, of the year by sophisticated hunter-gatherers who were capable of constructing and managing the complex chains of walls that make up the ‘kite’ systems, and who had their own fine artistic traditions that were apparently unique to the steppe. Excavations at Dhuweila also showed that there was much to be learned about the Late Neolithic in the steppe. This period also promised to have its own unique characteristics. It seemed likely that the Late Neolithic was the time when domesticated sheep and goats were introduced to the region, establishing the foundation of the nomadic pastoral traditions that have shaped the *badia* from that time until the present day. It was particularly to address the question of the origins of sheep–goat herding in the region that the final field programme, the Burqu’-Ruweishid Project, was proposed in 1986.

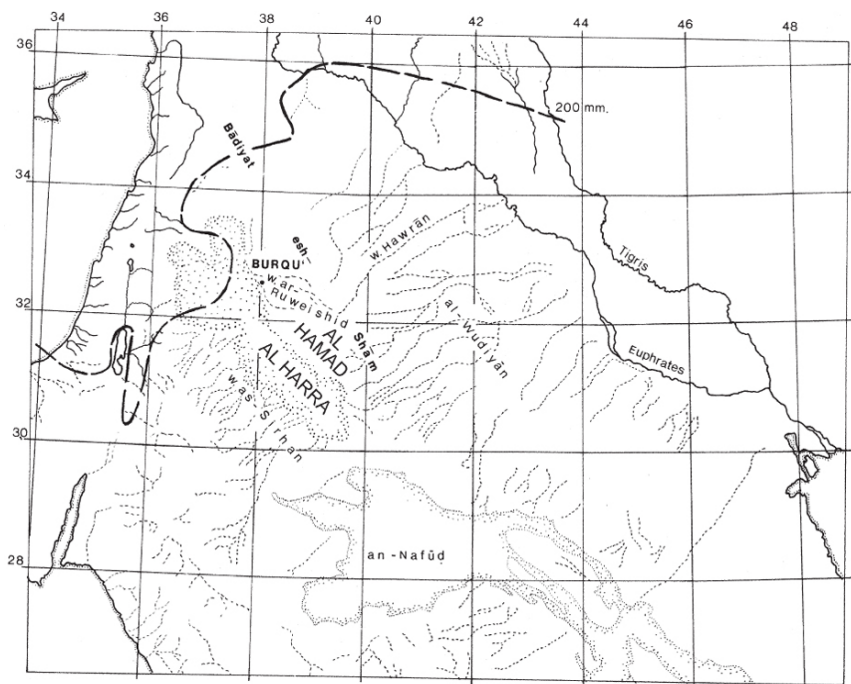


Figure 1.1 Badiyat al-Sham

This volume is mainly concerned with the Late Neolithic and Chalcolithic/Early Bronze Age periods in the east Jordanian *badiya*, and, in particular, the results of the Burqu'-Ruweishid Project. During the earlier Black Desert Survey four sites in the *harra* were sounded. Two of these sites, Khallat 'Anaza and Dhuweila, are fully documented in Volume I of this series (Betts *et al.* 1998). Of the other two, Jebel Naja is presented here. More detailed excavation of later prehistoric sites was carried out in the course of the Burqu'-Ruweishid Project, both around the lake at Burqu' and out into the *hamad* at the Late Neolithic site of Mahfour al-Ruweishid and the later rock-shelter occupation at Tell al-Hibr (Fig. 1.2); this volume provides reports on the remains at these sites, as well as data on many of the survey sites located in the course of fieldwork in the region. For the *harra* these include sites of the 'burin Neolithic' only, as the other survey sites have been published elsewhere (Betts *et al.* 1998; Betts 1982; Betts 1991a, 181 ff.), but for the *hamad* sites of all periods have been included. The remaining data on the historic periods, including architectural survey and excavation at the Qasr, will be the subject of a third and final volume in the series.

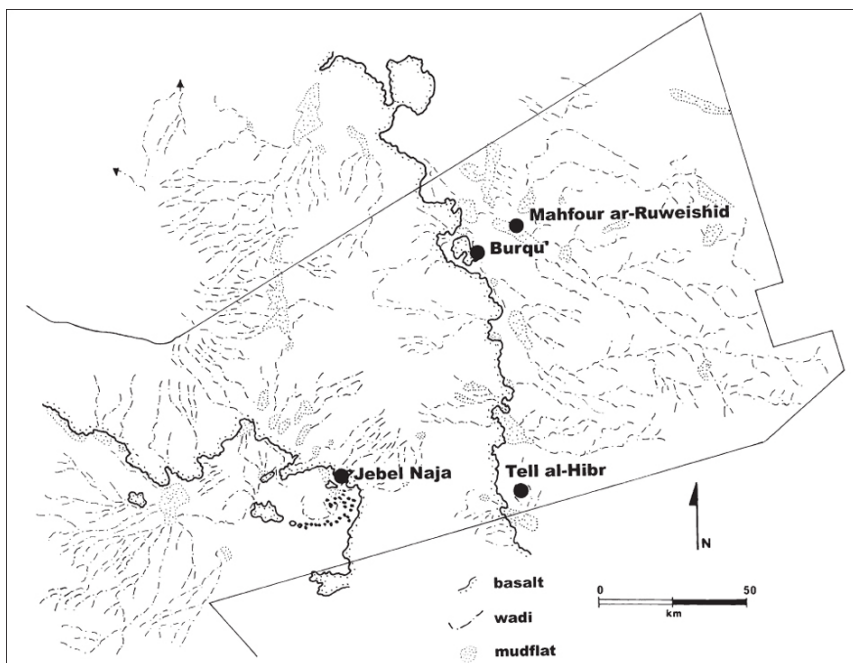


Figure 1.2 Eastern Jordan: excavated sites

The later prehistoric periods in eastern Jordan

The Neolithic period in the Near East is rich and complex. From its earliest stages it covers some of the most fundamental developments in human history, from incipient agriculture through to fully developed mixed farming economies and from small-scale social groups to huge complex settlements. The period is a long one, stretching broadly from the 8th to the 5th millennium BC, and its sites are found in a great variety of different environmental zones. The Neolithic sites of eastern Jordan reflect this diversity in ways which are still hard to understand. The region is beyond the area of viable agriculture and so in the Early Neolithic the *harra* in particular was used for hunting (Betts *et al.* 1998). From around the late 7th millennium BC there was another fundamental development, one which is less well known but almost as important as the development of agriculture: the appearance of the first herded domestic sheep and goats – the precursor to nomadic pastoralism. Late Neolithic sites are peculiarly varied, with differences in tool kits and structures which imply that a number of different subsistence strategies were in use. This contrasts markedly with the preceding Early Neolithic (PPNB), where sites are remarkably consistent throughout the region. The first moves towards herding may have taken place in the late Pre-Pottery Neolithic (PPNB) period, as suggested by evidence from sites in al-Azraq and Wadi Jilat (Garrard *et al.* 1996; Horwitz *et al.* 1999; Martin 1999), but evidence from the far eastern areas suggests that it was not until the Late Neolithic that the full extent of the *badia* was exploited for the first time by a totally new economic system. As

Martin (1999) stresses, this new system was not a complete change to full nomadic pastoralism but the introduction of a pastoral component into the existing hunter-gatherer lifestyle. The diversity of sites in this Late Neolithic period may also perhaps reflect a period of experiment in which combinations of hunting/gathering and livestock management were tested against the vagaries of nature. New social systems must also have been developed to cope with changing economic requirements. The Early Neolithic ancestral population to these first mobile pastoralists may have come from a village environment or have been hunter/gatherers. In either case their social systems would have needed radical adjustment to cope with both mobility and ownership of herds. The social organization of modern pastoralists is complex and very much linked to the requirements of herd management, and there is reason to suppose that, to some degree, the same situation prevailed in the Late Neolithic.

A drastic reduction in the number of sites is recorded for the post-Neolithic periods. This may be an archaeological problem rather than a reality. Prehistoric sites in the *badia* are identifiable only through concentrations of diagnostic chipped stone artefacts, and Chalcolithic sites east of the *harra* have rough flint assemblages with few diagnostic artefacts, none of which are clearly related to tools found on sites of the same period in the west. It has been possible to trace the Chalcolithic only through the analysis of a long prehistoric sequence at Burqu', where Chalcolithic levels were stratified above those of the Late Neolithic in a semi-continuous sequence, probably representing consistent seasonal use of sites around the lake over many hundreds of years. Identification of the other Chalcolithic site, the rock shelter at Tell al-Hibr, was by chance. Some painted pottery was found on the scree slope, while burials were visible inside the mouth of the cave. The site was investigated in the belief that it was a Chalcolithic tomb; it turned out to be a late burial within a cave previously used as a Chalcolithic occupation site. Sites of the Bronze Age are even more elusive. One sherd from a wavy ledge-handled jar dating probably to the EBIII was found near Qattafi Wells (Betts 1984, fig. 7, 17), while flint from the corral complex on the summit of Maitland's hillfort in the same area may also be Bronze Age in date (Maitland 1927; Rees 1929; Betts 1986, 296, fig. 6.7; G. Rollefson pers. comm.). It is unlikely that the *badia* was ever entirely unused by human groups, although very slight changes in climate could render it extremely difficult to sustain a living by herding. It is perhaps likely that a time of experimentation in the Late Neolithic gave way to a more unified pattern of existence but that these later periods become increasingly archaeologically invisible, with limited use of stone tools, by now relatively undiagnostic, coupled with equally limited use of mostly undiagnostic ceramics. One objective of the work at Burqu' was to try to identify the diagnostic subtleties in later chipped stone assemblages through the careful construction of a chronological typology. This aim has been achieved to some degree and the analyses described in this volume may serve as a reference for further work in this direction.

History of research

The first written accounts of the Badiyah al-Sham in western literature came from early travellers to the region who documented primarily the lifestyle of the nomadic peoples they encountered there. Among the better known of these are

Musil (1927; 1928) and Doughty (1936). Descriptions of landscapes and occasional remarks on earlier structures and artefact scatters are also included in passing: 'We found upon this higher ground potsherds and broken glass – as in all ruined sites of ancient Arabia, and a few building stones, and bricks ...' (Doughty 1936, 420). During the First World War the region became a focus of British conflict against the Turks. The efforts of T. E. Lawrence to raise the tribes brought him into the desert but, despite his archaeological training, his accounts of his wartime experiences reflect the events of his times and contain very little mention of the history of the region (1927; 1935), his awareness of which appears only in passing comments: 'It was to be Ali's first view of Azrak and we hurried up the stony ridge in high excitement, talking of the wars and songs and passions of the early shepherd kings, with names like music, who had loved this place; and of the Roman legionaries who languished here as garrison in yet earlier times' (Lawrence 1927, 233). The end of the war and the division of the Middle East into spheres of British and French interest gave rise to a new overland route linking Palestine and Transjordan to Iraq. This was supplied by the RAF, who established a series of landing grounds across the desert with a road marked by cairns that was used for a time in the 1920s and 1930s by the Nairn Transport Company (Munro and Love 1981). The route is still visible in parts between Azraq and Qa' al-Wisad: it is known locally as the *Abu Rujjūm* (Father of Cairns) track.

The establishment of the route led to the first published reports of archaeological finds in the region. In 1923 Holt noted 'long walls that lead to smaller fortifications ...', a reference to the ubiquitous ancient animal traps ('desert kites') in the *harra* (Holt 1923, 262). Aerial reconnaissance by RAF pilots flying across the *harra* resulted in two important publications. Maitland (1927) and Rees (1929) both reported on structures visible from the air, some of which they visited on the ground. The first purposive surveys of the region were carried out by Field (1960) between 1925 and 1950, primarily along the main trans-desert routes. He was the first to collect chipped stone from sites across the region, which was published by Garrod (1960). Garrod had little comparative material on which to base her analysis, but noted the remarkable abundance of burins on many of the desert sites, particularly those around Jebel Um Wual, a basalt outlier to the east of the *harra*, now in northern Saudi Arabia, and proposed that a new name, Wualian, should be given to this industry. At the time of her research, Waechter and Seton-Williams (1938) began excavation in Wadi Dhobai, a scatter of prehistoric sites adjacent to a deep gorge in the limestone country south-west of al-Azraq. Here they recovered similar burins in association with tanged arrowheads which they rightly compared to those being recovered by Kenyon from Neolithic levels at Jericho. Based on parallels between the material from Wadi Dhobai and Jebel Um Wual Garrod tentatively assigned to the Wualian a date no earlier than the Natufian and no later than the Bronze Age (Garrod 1960, 119). At around the same time a groundwater survey drew attention to sites around the oasis of al-Azraq, some of which were more fully investigated by Kirkbride (Zeuner *et al.* 1957).

In 1966 Helms began survey in the *harra* east of Mafraq, continuing this work in conjunction with excavations at the Bronze Age site of Jawa (Helms 1981; Betts 1991a). In 1975 Garrard *et al.* (1975) began more formal survey of the Azraq Basin. Garrard later established a major programme of survey and excavation

around al-Azraq and in Wadi Jilat that included within it the sites previously investigated by Waechter and Seton Williams (Baird *et al.* 1992; Baird 1993; Garrard *et al.* 1986; 1987; 1988a; 1988b; 1994a; 1994b). The 1980s saw a marked increase in the number of expeditions to eastern Jordan focusing on prehistory. Rollefson (1980; 1982; 1983a; 1983b; 1984; 1985; 2000) continued the work of Kirkbride at 'Ain al-Assad (Lion's Spring) and surveyed sites at Jebel Uweinid (Rollefson and Fröhlich 1982). Copeland and Hours began intensive study of Palaeolithic sites on terraces and ancient shorelines around the Azraq lake (Copeland and Hours 1989), while Muheisen (1983) undertook excavations at a large Epi-Palaeolithic site near Kharaneh. Work documented in this volume began with a survey at Qa' Mejalla east of al-Azraq in 1979, which was followed by three seasons of survey and test excavation in the *harra*, a full season of excavation at the hunting camp of Dhuweila on the TAP Line track in 1986 and three seasons of excavation and survey at Burqu' in 1988, 1989 and (after interruption by the first Gulf War) 1991.

This body of new research began to result in a much clearer picture of the prehistory of the region, particularly from the Epi-Palaeolithic to the early Chalcolithic periods. It became clear that the pre-Natufian Epi-Palaeolithic was located primarily to the west, at favoured places in the wadis leading down to the oasis at al-Azraq. Extensive sites representing repeated short-term use were investigated in Wadi Jilat (Byrd 1988; 1998; Byrd and Garrard 1990; Garrard and Byrd 1992) and at Kharaneh (Muheisen 1983; 1985; 1988). Traces of Natufian occupation were identified in Wadi Jilat, in the Azraq oasis and at scattered locations across the *harra* out to its eastern margins, but the most extensive use of the region was in the Late Natufian and was concentrated to the north-west, along the wadis running down from Jebel Druze in southern Syria (Garrard *et al.* 1988a; Betts *et al.* 1998, 11–35). Here substantial occupation sites yielded evidence for structures with stone foundations, stone pavements and heavy stone grinding and pounding equipment. The rainfall in this area is higher than that of the southern *harra* and the sites would have benefited from proximity to seasonal water flow in the deeply incised wadi systems, particularly the substantial flow from Wadi Rajil, on which two of the largest sites were located.

Evidence for the Pre-Pottery Neolithic A (PPNA) is virtually absent from the region, implying a retreat from the steppe in this period. Recolonization appears to begin in the Middle PPNB, based on evidence from Wadi Jilat (Garrard *et al.* 1994a; 1994b; 1996). In Syria, PPNB sites have been found in the Palmyrene oasis (Akazawa 1979) and at el-Kowm (Stordeur 2000). The seasonally occupied sites in the semi-arid steppe in Wadi Jilat and al-Azraq oasis show evidence for domesticated cereals from the mid-PPNB and herding of caprines by the Early Late Neolithic (Garrard *et al.* 1994a; 1994b; 1996), while evidence from el-Kowm indicates the limited presence of cereals at Qdeir 1 (Stordeur 1993, 200–1). Further into the *badia*, cultivated cereals disappear: at Dhuweila only wild einkorn and wild barley were recovered (Colledge in Betts *et al.* 1998, 185 ff.), while the sites around the lake at Burqu' yielded no cereals at all (see 'Botanical remains', below). The earliest confirmed date for caprine herding at Burqu' is in the Late Neolithic (Site 27000: 6230–5950 cal. BC) (McCartney 1992). The Late Neolithic also sees a marked expansion beyond the *harra* into the *hamad* almost as far as the Euphrates (Stordeur 1993; 2000; Baird 1993).

The problem of the ubiquity of burins has been much debated. The 'Wualian' (Garrod 1960) and the 'Dhobaian' (Waechter and Seton Williams 1938) clearly belong in some way to the same tradition as the 'burin Neolithic' identified by Betts (1986, 201 ff.), but the issue remains a cloudy one. Evidence from the Black Desert Survey led to the conclusion that the large numbers of sites with surface scatters containing remarkably high proportions of concave truncation burins should be dated in the Late Neolithic. This proposal was based on the presence of small numbers of bifacial knives and very rare small arrowheads of Late Neolithic form, together with a date of 6455–6080 cal. BC for occupation levels at Jebel Naja (see 'Late Neolithic Sites in the *Harra*', below). This proposal was disputed by Baird (1993, 523 ff.), who showed that at Wadi Jilat significant proportions of truncation burins begin to appear, together with tanged arrowheads as identified by Waechter and Seton Williams, in the chipped stone assemblages from the Middle PPNB onwards, increasing in numbers through time. He thus dismissed the potential link with early herding proposed by Betts. Through new excavations and rigorous study of the Neolithic industries first identified by Waechter and Seton Williams, Baird has clarified the issue of the Dhobaian and the introduction of truncation burins, but the precise relationship of the burins to the subsistence strategies of the *badia* remains unclear. The Wualian, without arrowheads, is clearly the same phenomenon as the 'burin Neolithic', with sites (such as Jebel Naja) occurring in large numbers around the western margins of the *harra* and extensively across the wadi systems of the *hamad* (see 'Area Survey in the *Hamad*', below). Generally, however, it seems that the Wualian tradition is Late Neolithic in date. The link between the 'burin Neolithic' sites and the introduction of herding to the steppe is discussed extensively below, but it is not yet clear whether the sites represent special activity sites or a separate cultural tradition.

Another problem that has received much discussion is that of the 'desert kites'. Results from the Black Desert Survey and excavations at Dhuweila (Betts *et al.* 1998) showed that in the Late PPNB the *harra* became the focus of highly intensive hunting, particularly of gazelle. Many of the hilltops have knapping sites for the production of projectile points, and were almost certainly used as lookouts for game, as the raw materials for knapping had to be carried up to these inconvenient workshop locations. Evidence for the processing of carcasses was found at Dhuweila, which was occupied in two key periods – the Late PPNB and the Late Neolithic. Dhuweila, and more especially soundings at a nearby PPNB hunting camp, Abu Masiad, provided evidence for the use of 'kites' as hunting traps in this period, and it was suggested that a large number of the chains of 'kites' stretching across the *harra* could be dated to this early period. Although support is growing for this view (e.g. Bar-Oz *et al.* 2009), the date and the function of the 'kites' are still the subjects of speculation in academic literature. Echallier and Braemer (1995), for example, suggested that they may have been used to corral semi-domesticated animals, a claim disputed elsewhere (Rosen and Perevolotsky 1998).

A third topic of debate concerning the Neolithic, and one that is addressed extensively in this volume, is the introduction of domesticated animals into steppic economies. The debate revolves around two key issues: the date of the introduction of domesticates and the economic management of this new resource. The first question has been answered in broad terms through evidence from Wadi Jilat for the first appearance of caprines in the Early Late Neolithic (Garrard *et al.*

1996, 214 ff.) and evidence from Burqu' (discussed in this volume) indicating that they appear there at least by the Late Neolithic, although an Early Late Neolithic presence cannot be ruled out. The means by which domesticated animals were introduced into the steppe economies are less clear. This issue has been discussed in detail by a number of scholars (Köhler-Rollefson 1988; 1989a; 1989b; 1992; Byrd 1992; Martin 1999), and the theories can be broken down into two basic models: one in which herding is introduced to the steppe by people from the settled villages in the verdant regions, and one in which a steppe population of hunter-gatherers separate from the villagers adopt herding as one component of their varied subsistence base (see 'The Eastern *Badia*', below).

Terminology is also an issue that must be addressed in dealing with the Neolithic in the steppe. Baird (1993, 77) has adopted the use of the term Early Late Neolithic as the steppe equivalent in Wadi Jilat of the PPNC as identified at 'Ain Ghazal. This terminology is equally appropriate for the wider *badia*. This period is represented at Burqu', but cannot be clearly identified as a sub-phase within the general continuum of the Late Neolithic.

The end of the Neolithic in the steppe is essentially undocumented, while the following Chalcolithic remains only ephemerally recorded. While there is some evidence for this period (e.g. Betts 1992), sites from this time on gradually become less archaeologically visible and their nature and distribution remain largely unknown. Work by Quintero *et al.* in al-Jafr (2002) suggests that the Jafr core sites for the mass exploitation of tabular flint flakes can be dated to the Chalcolithic–Early Bronze Age, while survey and sondages by Tarawneh (2007) in the Bayir region and the upper slopes of the western Sirhan indicate that some of the isolated corrals high on wadi slopes in the *hamad* may also date to this period.

Geomorphology

The area of Jordan east of Mafraq/Azraq/Wadi Sirhan comprises two morphological units (Bender 1974). The first, the *harra*, geologically known as the North East Jordanian Plateau Basalts, starts about 15km east of Mafraq and extends eastwards for 160km. Altogether these basalt flows cover approximately 45,000 sq km from the southern edge of the Damascus Basin down to the east side of the Wadi Sirhan depression in Saudi Arabia. The Jordanian part of the basalt-covered area is about 11,000 sq km. The basalt plateau is interrupted by many isolated hills and long rows of volcanoes. From altitudes of more than 1000 m above sea level (asl) in the north-north-west, the land falls away to the south-south-east towards the eastern edge of the Wadi Sirhan at about 500 m asl.

East of the *harra* is the *hamad*, the North East Jordanian Limestone Plateau, a flat, stony desert extending north and east up to the Euphrates valley. It is occasionally interrupted by small scarps formed by more resistant beds of the Tertiary sedimentary sequence. From the western margin of the plateau, in the vicinity of H4/Ruweishid, the land rises in all directions. To the west the basalt shield lies at more than 700 m asl, while eastwards and northwards the land slopes up to altitudes of 750–800 m asl and to the south up to 750 m asl. Within the shallow depression thus formed there are many mudflats, some quite extensive, which follow the structural pattern of the underlying Tertiary limestones. Soils in eastern Jordan are poor, and those in limestone areas are typically 'grey desert soils' (sierozems), shallow and covered by a dense pavement of angular chert

fragments. Without irrigation, these soils provide only poor vegetation cover.

Survey and excavation methodology

Research aims

The overarching aim of the research discussed in this volume was to obtain a basic understanding of the nature and chronology of the later prehistoric periods in the eastern 'panhandle' of Jordan. Within this broad approach individual projects addressed more specific aspects of the question. The Qa' Muqalla (Qa'a Mejalla) survey was designed quite simply as a test study of a random sample of the region to assess its potential for further research. The sample choice was governed by the very limited availability of maps for the area in 1979. The subsequent Black Desert Survey aimed to sample a much wider and more varied selection of locations specifically within the *harra*. The third and final season was devoted to four two-week excavations at the most promising sites across a range of periods from Epi-Palaeolithic to Late Neolithic. This was followed by a season of extensive excavations at the site of Dhuweila, where test excavations had shown the importance and potential of the site for further research. By this stage a good overview of the Epi-Palaeolithic had been obtained and the Pre-Pottery Neolithic, including the question of the desert 'kites', had been reasonably solidly addressed. However, one important issue emerged from analysis of the Neolithic data: the introduction of the herding of sheep and goat in the *badia*. It was becoming clear that this took place sometime towards the end of the Pre-Pottery Neolithic or the very early stages of the Late Neolithic, but the means by which it occurred and the nature of its first appearance were unknown. This question was the driving force behind the establishment of the Burqu'-Ruweishid Project. Scattered around the lake at Burqu' are numerous small prehistoric stone mounds. The lake lies too far into the steppe to have been used by short-term herders from the edges of the verdant settled zone and so any evidence for early domesticated animals on sites there would indicate the first steps towards full nomadic pastoralism. The regular use of the lake for seasonal occupation also offered the possibility of establishing a typological sequence for the region, as the range in date and function of the sites excavated in the *harra* resulted in a highly diverse range of tool kits with limited potential for studying typological development through time.

With regard to Burqu', however, simple study of the prehistoric data was insufficient to understand the full picture of herding in the *badia*. Background research on nomadic pastoralism was therefore conducted on all periods from prehistory to the modern day, including in-field ethnoarchaeological studies, in order to examine land use and the social, political and economic realities of herding in the region. In this research the field team was greatly assisted by William and Fidelity Lancaster, whose work on the Rwala in the region offered an invaluable foundation to the survey work (Lancaster 1981; Lancaster and Lancaster 1991; 1993; 1999). As a result of this broader focus, survey in the *hamad* was not restricted to prehistoric sites but included all visible man-made structures and artefact scatters of any period from early prehistory to the present day.

Field survey

Sites were defined as concentrated scatters of artefacts and/or structures, isolated or in groups. Thus, for example, a hilltop with a multi-period flint scatter around a cairn with rock art would be counted as a single site, as would be a probably single-period flint scatter with no associated structures. Owing to the very large number of potential 'sites' within the *harra* only those of significant interest to the survey team were fully recorded. Thus only a small number of the rock art sites encountered were documented, and those mainly on the basis of features such as 'kite carvings', unusual images or inscriptions. Of the many corrals within the *harra*, only those with some distinctive features or diagnostic artefact scatters were recorded. In the case of chipped stone scatters, a preliminary search was made for diagnostic artefacts before it was decided to make a general collection on the site. On the other hand, ceramics, being rare, were generally recorded and collected. In the *hamad*, where 'sites' are much rarer, a significantly higher proportion of those encountered were documented.

Recording of sites was not conducted in any controlled or systematic manner. The sites documented in this volume were discovered over many field seasons and under differing circumstances. During the Qa' Muqalla (Qa'a Mejalla) and Black Desert surveys (Betts 1982; 1983; 1984; 1985; 1986; 1988), from 1979 to 1984, survey methodology consisted of establishing a series of base camps for a few days at selected areas away from the two main roads (the TAP Line and Baghdad Highway). The camp locations were selected with a view to providing access to a range of different landscapes, and from them daily expeditions were made by vehicle and then on foot to explore those locations where sites might be expected to be found, such as the edges of the mudflats, the hilltops and the wadi slopes. At such locations general surface collections of artefacts were made by gathering chipped stone without regard to form or diagnostic significance, in combination with purposive collection of visible diagnostic artefacts including chipped stone, ceramic sherds, beads, ostrich shell and any other items that might assist in the dating and analysis of the site. In some cases structures were planned using tapes or plane table, key features were photographed, and rock art noted and photographed. In all cases a general description of the site was entered in the field notebook. Much the same methodology was applied in the course of the Burqu'/Ruweishid Project (Betts *et al.* 1990; 1991; Betts 1993b), but here a more systematic coverage of the *hamad* was attempted. Owing to the open and easily traversable landscape it was possible to visit all major monuments and to sample sections of most of the major wadis. The results for this area are thus more comprehensive than those for the *harra*. Unfortunately, however, in the absence of GPS technology and because of the open nature of the *hamad*, it was almost impossible to locate sites accurately there from 1:50,000 maps. By contrast, the distinctively complex landscape of the *harra* made it easy to locate sites with a fairly high degree of accuracy. Thus it is possible to generalize broadly about the nature of land use in the *hamad*, while for the *harra* it is possible to be precise about specific sites and local regions: but this data cannot be applied to the area as a whole.

Site numbering

A regional numbering system has been adopted for all prehistoric sites in eastern Jordan covered by the various projects documented here. The numbering system is

based on the 1:50,000 map series, in which each map has here been assigned a two-digit number. Sites located within the limits of the map have been given a second two-digit number starting with 01, prefixed by the map number. Thus Jebel Naja, BDS 2321, is Site 21 on Map 23, which is map no. 3453 I in the 1:50,000 series. Table 1.1 provides a key to the map numbering. The exception to this method is Burqu', where sites were numbered consecutively according to a local sequence.

2933855	VII
2033855	IV
3933855	VII
2033855	IV
2933855	VII
0033855	IV
2933855	IV
2033855	IV
0333855	II
20. 3855	II
23. 3855	I
28. 3855	II

Table 1.1 Site numbering: 1:50,000 map correlation table

Excavation numbering

Within each site trenches were assigned three-digit numbers ending in 00. Each layer, as excavated, was given a two-digit number prefixed by the number of the trench. Thus Layer 302 would be Layer 02 in Trench 300.

Terminology

Different terms are used in the stratigraphy and phasing of the sites recorded in this volume. For the phasing of sites, three categories of stratigraphic ranking have been used. 'Stage' refers to a group of layers identified as belonging to a specific period. A Stage may be subdivided into 'Phases', which represent clear occupational event horizons within the larger unit. The term 'Level' is used mainly on small shallow sites where identification of major periods or occupation horizons may be difficult, and is also occasionally used to describe sub-divisions within Phases.

Stratigraphic conditions

Most of the sites exist in dry desert conditions. There is no real soil cover and the upper levels consist largely of compacted sand and gravels. The area is sparsely used by nomadic people and many of the sites have been preserved in almost pristine condition. Having gone unrecognized as archaeological sites, they have been spared from accidental damage and amateur collectors, and have been disturbed only when structures have been remodelled for secondary use. In many cases this is long after the original occupation levels were sealed by wind- and water-borne deposits. There are associated problems, however. Sites without structures have frequently experienced deflation, causing a palimpsest of

occupation levels to accumulate as one layer on the surface, and all sites are generally shallow, rarely more than a metre in depth, with the lowest levels lying just above bedrock. Allowing for some disturbance in topsoil, this limits the depth of reliably stratified deposits. Certain factors have also contributed to the mixing of deposits, with cracks in the dry topsoil causing small artefacts to move downwards, for instance. A more unusual factor is also in play: the annual movement of the larval stage of the beetle *Polyphylla fullo* may also be responsible for the downward movement of small artefacts (Evans 1982). This is evidenced at, for instance, most of the sites around the lake at Burqu', which were found to have a layer of small oval hollows forming a dense compact layer just below the surface. These were interpreted as insect casts, although the precise nature of the creature that caused them was not initially known. Similar casts were reported from excavations in the northern *harra* at Bosra (Seeden 1982). These were identified by a local woman as *hisan al-iblis*, the 'horse of the devil', a beetle larva which excavates a burrow for itself in the process of transforming into a pupa and then an adult beetle. The larvae feed on roots near the surface in the wet season but as the ground dries they burrow downwards to avoid desiccation and to feed on the lower roots of perennial shrubs, thus creating pathways for the movement of archaeological material.

Dating

Until recently, it was standard practice in Near Eastern prehistory to use uncalibrated dates or their raw equivalents in years BC. Recent improvements in calibration techniques have encouraged more accurate use of dates, with published calibrations. However, increasing accuracy in radiocarbon calibration has also highlighted some serious discrepancies in the broad date ranges commonly accepted for major periods within the prehistoric chronology. Uncalibrated and calibrated values for all Neolithic sites in the *harra* and the eastern *hamad* are shown in the chart above (Table 1.2), together with a recent chronology of the period for the Near East (Table 1.3).

<i>Lab. Number</i>	<i>Site</i>	<i>Years BP</i>	<i>Calibrated date cal. BC</i>	<i>%</i>	<i>Millemia</i>
OxA-526	Jilat 7	8810 ± 110	8226–7631	95.4	Late 9th–mid 8th
OxA-2969	Jilat 26	8740 ± 110	8206–7589	95.4	Late 9th–mid 8th
OxA-2407	Jilat 26	8720 ± 100	8201–7584	95.4	Late 9th–mid 8th
OxA-1802	Jilat 26	8690 ± 110	8201–7548	95.4	Late 9th–mid 8th
OxA-527	Jilat 7	8520 ± 110	7846–7311	95.4	8th
OxA-1637	Dhuweila 1	8350 ± 100	7581–7142	95.4	Late 8th
OxA-2770	Burqu' 35	8270 ± 80	7496–7081	95.4	Late 8th
OxA-2769	Burqu' 35	8180 ± 80	7467–7042	95.4	Late 8th
OxA-2768	Burqu' 35	8140 ± 90	7452–6826	95.4	Late 8th–early 7th
BM-2349	Dhuweila 1	8190 ± 60	7446–7058	95.4	Late 8th
OxA-2408	Jilat 25	8020 ± 80	7174–6682	95.4	Late 8th–early 7th
OxA-2766	Burqu' 27	7930 ± 80	7056–6642	95.4	Late 8th–early 7th
OxA-1800	Jilat 13	7920 ± 100	7074–6588	95.4	Late 8th–mid 7th
OxA-2411	Jilat 13	7900 ± 80	7044–6606	95.4	Late 8th–mid 7th
OxA-1801	Jilat 13	7870 ± 100	7047–6508	95.4	Late 8th–mid 7th
UB-3462	Jilat 13	7829 ± 89	7028–6480	95.4	Late 8th–mid 7th
OxA-1729	Dhuweila 2	7450 ± 90	6462–6098	95.4	Late 7th
OxA-375	Jebel Naja	7430 ± 100	6455–6080	95.4	Late 7th
OxA-2765	Burqu' 27	7350 ± 80	6395–6060	95.4	Late 7th
OxA-2764	Burqu' 27	7270 ± 80	6354–5994	95.4	Late 7th–early 6th
OxA-1728	Dhuweila 2	7140 ± 90	6221–5841	95.4	Late 7th–early 6th
OxA-1636	Dhuweila 2	7030 ± 90	6056–5734	95.4	Late 7th–early 6th
OxA-2808	Burqu' 03	6900 ± 100	5984–5636	95.4	Early 6th
Wk-20219	M. al-Ruweishid	6085 ± 67	5212–4841	95.4	Late 6th–early 5th
OxA-2767	al-Hibr	3950 ± 80	2674–2200	95.4	3rd

Table 1.2 Radiocarbon determinations for the eastern badia (OxCal. V4.1.1 Bronk Ramsey (2009); r:5 IntCal 04 atmospheric curve (Reimer et al. 2004))

Chipped stone

The chipped stone from the Burqu' sites has been jointly analysed by McCartney and Betts: McCartney has worked primarily on the technological aspects of the assemblages, and Betts on tool typology.

System of analysis

I. Removals

A. Blanks

1. complete blanks
 - blades
 - flakes
 - bladelets
2. broken blanks – still identifiable according to type
3. blank pieces – only identifiable by platform or termination
4. indeterminate blank fragments

B. Chips – all blanks between 15 mm and 10 mm.

1. complete
2. chip platforms/terminations
3. indeterminate fragments

C. Microchips – chips less than 10 mm.

1. complete
2. platforms/terminations

- 3. indeterminate fragments
- D. Spall
- II. Waste
 - A. Indeterminates – not identifiable
 - B. Chunks and core shatter
- III. Core elements
 - A. Crested blade
 - B. Platform rejuvenations
 - C. Overshots – plunging platform removals
 - D. Plunging blanks
- IV. Nuclei
 - A. Cores – identifiable by type
 - B. Core fragments – not identifiable as to type
 - C. Splintered pieces
 - D. Split pebbles
- V. Retouched nuclei
 - Cores, splintered pieces and the enigmatic bashed pebbles which appear to have been used/reused as tools
- VI. Tool elements
 - A. Diagnostic tools
 - B. Retouched/utilized complete blanks
 - C. Broken retouched blanks/retouched fragments
 - D. Truncations – separated by size > 15 mm and < 15 mm
 - 1. platform truncations
 - 2. termination truncations
 - 3. truncation segments
 - E. Resharpening splinters, spalls, flakes

Lithic technology

Data documenting the core technologies of Jebel Naja and Burqu' 02000, 03000, 11000, 27000 and 35000 were collected as part of McCartney's doctoral research (McCartney 1996). Data from Burqu' 18000 and 20000 and Mahfour al-Ruweishid were added to complete the present report using the same sample methodology.

Raw materials

A variety of raw materials were used in the Burqu' and other assemblages. Medium- to good-quality grey/brown chert is the most common chert type, and is available from outcrops in the *hamad* east of Burqu' and also on the western side of the *harra*. Occasional use is made of a fine-grained chalcedony in colours ranging from buff to creamy white. This occurs in isolated outcrops on the edge of the *harra* south of Burqu' and on the south-eastern edge of the Azraq Basin in the west (Betts *et al.* 1998, 34, fig. 2.21). Obsidian occurs very rarely. On the later sites, greater use is made of local materials, primarily the small rough chert pebbles from the surface of the *hamad* in the immediate vicinity of the lake.

Raw materials were classified according to a series of ranked types based on visible attributes of surface roughness and homogeneity: type 1 – chalcedony or high-quality chalcedonic cherts; type 2 – fine-grained good-quality chert; type 3 –

fine-grained good-quality chert with minor inclusions or flaws; type 4 – medium-grained moderate-quality chert; type 5 – medium-grained moderate-quality chert with inclusions or flaws; type 6 – coarse-grained or poor-quality cherts. The same ranking series was applied to the cores and a sample of blanks from each assemblage studied. The form of core and blank dorsal cortex was studied to refine the analysis of raw material utilization.

Core technology

Blanks were defined as any unworked flake, blade, bladelet, chip or spall. Blades and bladelets were defined as any blank with a length two times or greater than the width orientated to the flaking axis, with bladelets restricted to pieces not more than 40 mm long and 12 mm wide. Chips were defined as any blanks less than 15 sq mm. Spalls were defined by their method of production by the burin-blow technique. All flakes, blades and bladelets were sub-divided into three groups based on the presence of dorsal cortex: type 1 blanks are fully cortical, type 2 are partly cortical and type 3 have no dorsal cortex. Patination was considered to be cortex when the weathered surface was not obviously part of the scarring pattern associated with the most recent use of the material. All incomplete blanks, regardless of type, were combined in the blank fragments category. Most broken blanks were not suitable for quantitative measurement and so for consistency the few pieces which were recognizable were treated as the other broken pieces.

Cores were defined by the type and orientation of the striking platform, except for the cores-on-flakes (or flaked flakes), which were defined by clear blank attributes, and the splintered pieces, which were defined by the use of the bipolar-on-anvil technique. The amorphous type represents heavily exhausted cores or cores with no systematic orientation of striking platforms, combining elements of other types. Core fragments, on which no striking platform is preserved, represent pieces that could not be assigned to type. The latter, along with tested raw materials and pebbles split by a single (core-opening) blow, were counted with complete cores in the assemblage totals and artefact counts, but were not considered further. All core types excluding the splintered pieces were produced using direct percussion. Cores were attributed to categories specific to raw material type (e.g. tabular, pebble, unidentifiable) to give a preliminary indication of the use of raw materials.

<i>Period</i>	<i>Uncalibrated age BP</i>	<i>Calibrated age BC</i>	<i>Millennia</i>
Pre-Pottery Neolithic A	10,200–9400	9800–8400	10th–9th
Early Pre-Pottery Neolithic B	9400–9200	8400–8100	Late 9th
Mid Pre-Pottery Neolithic B	9200–8500	8100–7500	Early 8th
Late Pre-Pottery Neolithic B	8500–8100	7500–7000	Late 8th
Terminal PPNB/Pre-Pottery Neolithic C/Early Late Neolithic	8100–7600	7000–6500	Early 7th
Pottery Neolithic/Late Neolithic	7600	6500	From late 7th

Table 1.3 Chronology of the Neolithic of the Near East (after Horwitz et al. 1999, 64–5)

Core trimming elements follow standard definitions for platform rejuvenations, crested core preparation pieces, overshots and core tablets. Simple platform rejuvenation flakes are the dominant type. Crested pieces were more typically

flakes rather than the classic crested blades employed in formal core technologies, but were used like crested blades to shape the core face prior to blank removal.

Attributes

A sample of 100 blanks was studied for each assemblage in order to monitor elements of core reduction methodology and knapping technique, including butt type, average dimensions, ventral surface and butt characteristics and dorsal scar pattern. Similar data, including average dimensions and state of preservation, were collected for the samples of core, which together with the blank attributes provide a means for comparing the core technology shown in each of the various assemblages. Data collected for termination type, striking platform angle and platform preparation, as well as interior and exterior butt angles, were found not to vary significantly between the assemblages and are therefore excluded from the present discussion.

Lithic typology

All pieces with secondary retouch were analysed using the basic type series employed in Volume 1 (Betts *et al.* 1998). This divides tools into major categories (e.g. burins, scrapers, denticulates and so on) with sub-divisions in each category as appropriate: tools also include truncation elements. These fall into three categories:

Truncation platforms, defined as blanks which exhibit only an identifiable platform, the lower end of the blank having been struck off. Each truncation must show signs of the truncation blow, a strike mark on either the dorsal or ventral surfaces as well as signs of abrasion or chipping on the positive ventral scar of the truncation itself.

Truncation termination: as above except that the termination rather than the platform is present.

Truncation segment: mid-sections, often quite small. These pieces show neither platform nor termination which can be clearly identified. They do exhibit signs of intentional truncation on either end (sometimes also on one or both sides) and retouching generally on most edges.

The system permits the inclusion of new sub-types and, more rarely, tool types. Charts are provided for each excavated site showing absolute and relative counts for major tool groups and absolute counts by phase and stage for both types and sub-types. While there are always problems in comparing typologies between different researchers, the typology used here is intended to fit as closely as possible to existing published typologies from elsewhere in the southern Levant, using terminology that is widely accepted by most lithic analysts. An extensive range of examples of each major tool group and most sub-types has been illustrated.

Zooarchaeological methodology

Zooarchaeological data was collected from the Burqu' and Hibr animal bone assemblages to facilitate discussion of the procurement of animals at each site, and for a comparison of patterns through time and between sites. The basic faunal data

from each site, broken down into phases of occupation where relevant, is presented below. In addition, information was recorded to allow a brief exploration of issues of site formation and potential assemblage loss/bias.

All excavated deposits from the Burqu' sites and Hibr were dry sieved through a 1 mm mesh, aiding consistent retrieval of animal bones of hare-/fox-sized and larger mammals. The assemblages were studied in the UK using the personal animal bone reference collection of Dr Andrew Garrard and the comparative collections at the Institute of Archaeology, University College, London and the Department of Archaeology and Prehistory, University of Sheffield. Bird bones are the subject of a separate forthcoming study, and are listed here only according to size class (e.g. small bird, medium-sized bird).

Since the assemblages tend to be small in size (with each containing numbers of diagnostic fragments in their tens or hundreds rather than thousands), an attempt was made to identify as much material as possible. Identification to taxon was thus attempted on all longbone fragments, small bones like carpals and tarsals, and individual teeth, where possible, and to animal size-class where taxon was not possible. Quantification is expressed as NISP (Number of Identified Specimens) counts and relative proportions thereof.

The assemblages were studied over a period of time, during which methodological approaches to recording the non-identifiable fraction varied slightly. While quantification methods remained consistent throughout (with all assemblages having counts and weights of the non-identified versus the identified fraction, allowing for the calculation of the percentage of identifiable), only certain assemblages have additional taphonomic information recorded. The systematic recording of bone modification/preservation by context (e.g. modal fragment lengths, preservation and angularity of fragments, colour of bones) began only at a later stage of the study, and hence is only available for some sites.

A major question which it was hoped could be addressed by the faunal remains is the timing of the introduction of sheep and goat to the *badia* region, and the nature and development of caprine herding in the region. Sheep and goat were separated where possible following the criteria described by Boessneck and Prummel and Frisch, and ageing data for sheep and goat follows Silver (Boessneck 1969; Prummel and Frisch 1985; Silver 1969).

2. Late Neolithic Sites in the *Harra*

A. Betts, L. Cooke, A. Garrard, C. McCartney and D. Reese

Most substantial Late Neolithic sites in the *harra* have been found close to the edges of the basalt flows, particularly in the south-west, where the *harra* narrows and gives way to gravel plains and wind-blown sand. Here there is a combination of sheltered east-facing basalt promontories overlooking open plains which seems to have been particularly attractive to the Late Neolithic population in the *harra*. Elsewhere, deeper within the basalt plateau, there are traces of Late Neolithic usage, including flint scatters, some possibly associated with structures, but the sites seem to have seen only short-term use and have little build-up of occupation debris, with the exception of hunting camps such as Dhuweila and Zumlat 'Arus (Betts *et al.* 1998). The sites discussed in this chapter are all in the south-western sector; some are on the edges of the basalt massif, while others lie further into the basalt, but are still within a short distance of the open plains (Fig. 2.1).

Excavated sites

Jebel Naja

BDS 2321 map ref. 3453 I 553296

Jebel Naja is on the western side of the *harra*. It lies on a steep east-facing slope sheltered from the prevailing wind by the rim of the basalt plateau and overlooking the alluvial fan of Wadi al-Qattafi where it runs out of the *harra* onto the open gravel plains (Fig. 2.2). The site comprises a dense scatter of worked flint in and around a cluster of corrals and cleared terraces (Fig. 2.3). These structures vary greatly in date and have been extensively reused over a long period. The earliest occupation on the hillside dates to the Middle Palaeolithic. Chert beds that outcrop on the slopes below the basalt plateau were exploited extensively in both the Palaeolithic and Neolithic periods. The Palaeolithic artefact scatter is dispersed

and no longer *in situ*, and several tools in the Neolithic assemblage were made on Palaeolithic flakes. The Neolithic assemblage consists predominantly of concave truncation burins on short thick chert blades. Concave truncation burins are found in large numbers on steppe sites from the mid-PPNB (Baird *et al.* 1992) into the Late Neolithic. A radiocarbon date of 6455–6080 cal. BC (OxA 375; see Table 1.2) was obtained from a hearth in Trench 400 (Pit 2). This, together with the arrowhead forms, puts the main occupation at Jebel Naja into the Late Neolithic period.

The Late Neolithic seems to have been the most intensive occupation at the site. The area must have been visited regularly by Neolithic groups. There is good grazing in the wadi below the site, and shallow *ghudrān* form in the wadi bed after heavy rain. There are also pools further up Wadi Qattafi into the *harra*. However, all these water sources are limited and it is likely that Jebel Naja was used predominantly in winter and spring, with the sheltered location providing protection from winter winds. The location was clearly a good one, because the site has been intermittently occupied from the late 7th millennium BC up to the present day. Walls which may have been constructed in the Neolithic have been constantly rebuilt and rearranged to provide shelter and protection for humans and animals. Artefactual evidence for post-Neolithic periods is limited, however. A few coarse-ware sherds of indeterminate date were found on the surface, and there is a scatter of recent artefacts such as wooden pegs, tin cans and broken coffee cups.

Surface collection of artefacts was carried out over the area with the greatest density of flint scatter. Four trenches were opened up in locations dictated by the density of artefact scatter and visible wall lines. One-third of all the sediment recovered from the soundings was sieved (3-mm mesh), with the exception of that from the lower levels of Trench 400, which was all sieved. There was very little soil cover, even at the downslope end of the terraces. The maximum depth at which bedrock was reached was less than 0.50 m. No botanical remains were recovered, but the site produced a small quantity of bone.

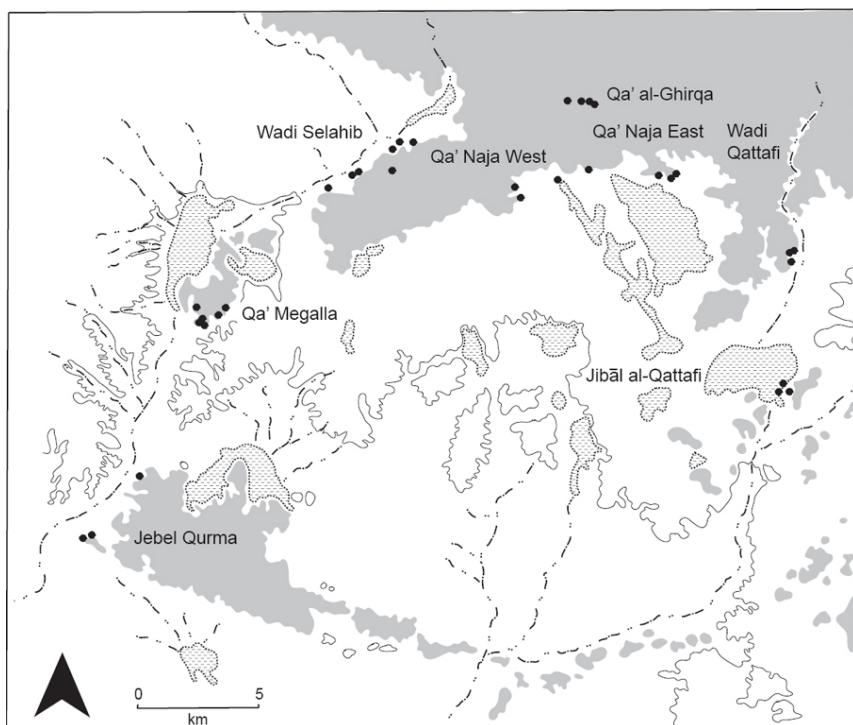


Figure 2.1 Late Neolithic sites in the western harra

Stratigraphy

100

A trench (6 × 7 m) was laid out around a cairn at the north-east end of the site. The ground around the cairn was covered in a thick scatter of worked flints. The uppermost level (Level 5) comprised the first 30 mm of topsoil around the cairn and a light brown sandy fill among the stones of the cairn. A section of the cairn was removed: no artefacts or structural features that might provide dating evidence were found, but it was evident that the rubble mound overlay, and so post-dated, the Neolithic occupation of the site. Finds from this level are unstratified. Below the topsoil was a layer of hard brown gritty soil (Level 4) extending over the whole sounding. This contained a dense concentration of worked flint. Below Level 4 was a further layer of brown gritty soil (Level 2) cut by an ashy pit (Level 3). The pit fill consisted of loose soft light grey ash with few finds. Below Level 2 and resting on bedrock was a thin layer of brown stony soil with some worked flint (Level 1).

The cairn was undatable, although apparently later than the Neolithic occupation. The ash pit might belong to the Neolithic period; however, it is not possible to be certain on this point as the layers sealing it were shallow and the artefacts they contained may not have been *in situ*, but carried downslope by soil movement. In the absence of clear occupation levels, the same proviso applies to

the finds from Level 1.

200

A trench (2.5×1.5 m) was laid out against the downslope side of one of the terraces. The uppermost 50–70 mm of the sounding (Level 3) were of light brown gritty soil, becoming slightly ashier towards the base of the level. Below this was a soft brown fill (Level 2) running up against the terrace wall at the downslope end of the cut. The lowest level (Level 1) had a similar fill but was more compacted in places. Level 1 also abutted the terrace wall, which was founded on bedrock.

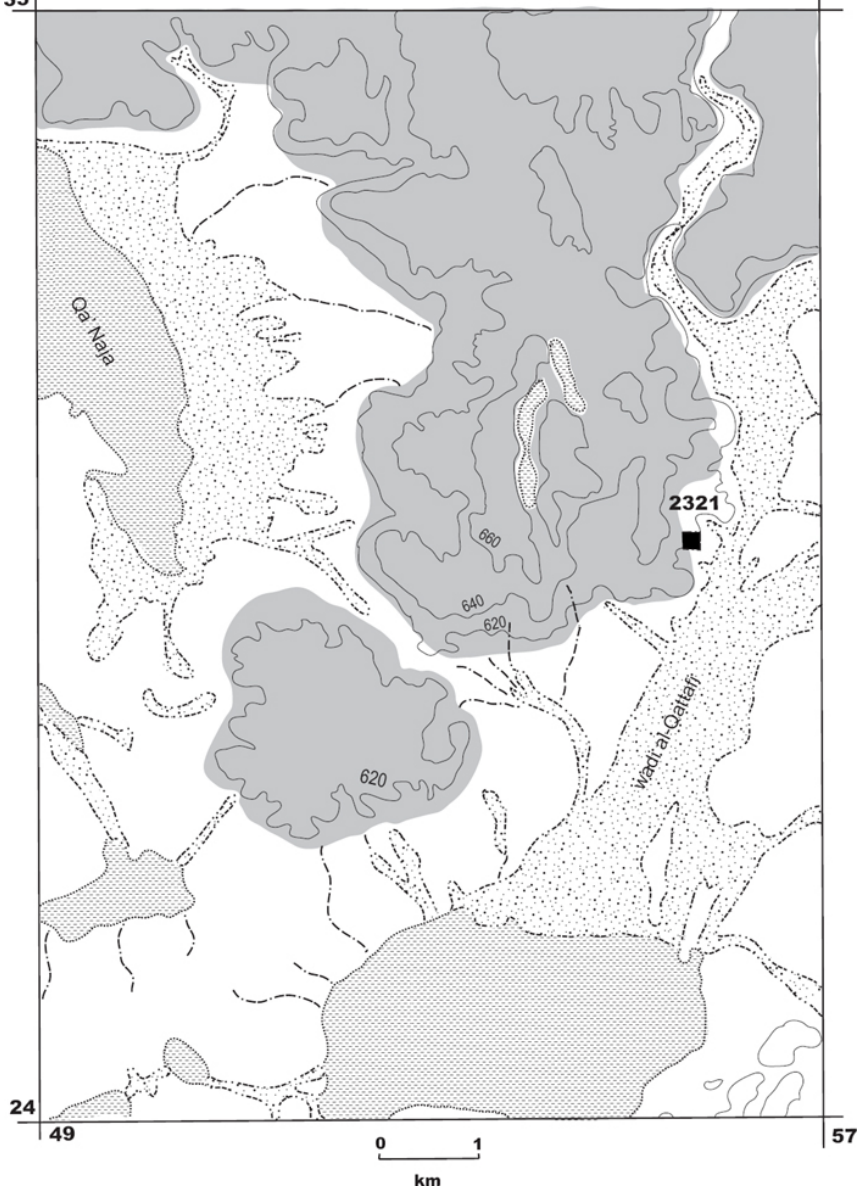


Figure 2.2 Jebel Naja: site location map

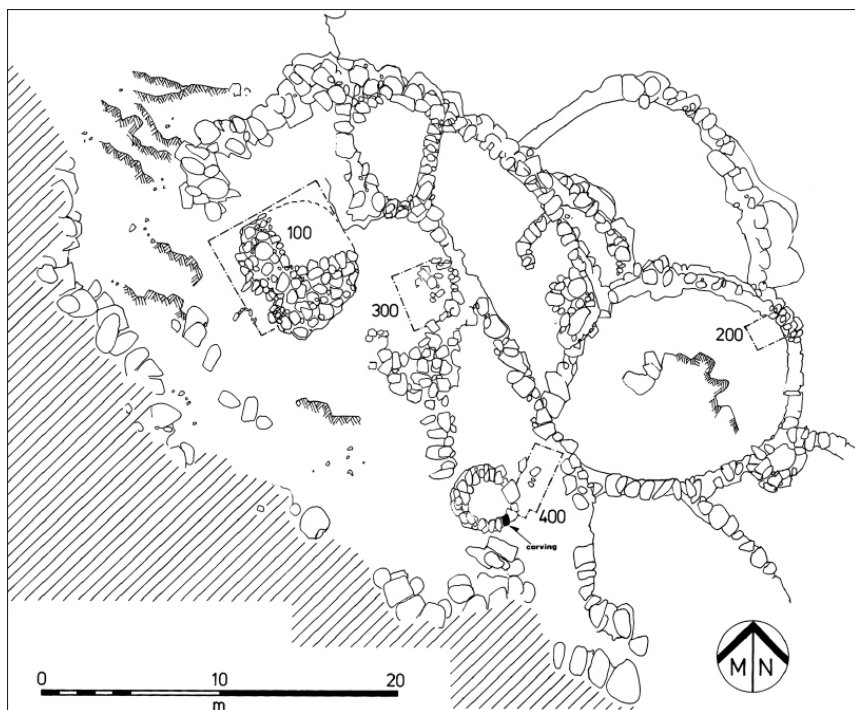


Figure 2.3 Jebel Naja: site plan

The trench contained chipped stone, but had no clear occupation levels. As with Trench 100, the artefacts may have been disturbed by soil movement. The terrace wall was founded on bedrock but because of the lack of stratigraphic evidence it is impossible to date.

300

A trench (2×3 m) was laid out over a concentration of large stones downslope from Trench 100. The topsoil, the first 50–70 mm of fill (Level 3), was a gritty brown sediment with few artefacts. Below this lay Level 1, which was cut by an irregular pit with loose ashy soil (Level 2). The soil in Level 1 was light brown and gritty, and contained rather more artefacts than Level 3. There was no clear change in the soil deposits from the base of Level 3 down to bedrock. The sounding revealed traces of what may have been very irregular walls in Level 1, but there were no well-defined occupation levels in association with the stones.

400

This area (2×4.1 m maximum extent) was selected for excavation because of its particularly dense concentration of surface artefacts (Fig. 2.4). At its southern end the trench abutted a small circular stone structure. The topsoil (Level 5), down to about 50 mm below the surface, was sand and gritty brown soil with a high concentration of worked flint. Below the topsoil was a layer of sandy brown soil

(Level 4) that was quite compact in places and contained worked flint. Below and sealed by Level 4 lay two hearths or small, irregular cuts filled with loose, ashy soil (Pits 1 and 2). Pit 1 was partially ringed by basalt pebbles, while Pit 2 was sealed by an irregular layer of stones and crudely lined with pebbles. Some small flecks of charcoal were recovered from it. The two pits were designated Level 3. They were cut into Level 2, which consisted of fine ashy soil containing heat-cracked flint, a few fragments of bone and worked flints, as well as some associated with bead-making: small chunks of soft pink stone and ‘Dabba marble’, bead blanks and complete beads. This level continued down to bedrock. Level 1 was a pit (Pit 3) cut down into bedrock from above the base of Level 2. It was filled with loose dark ash containing worked flint.

This sounding was the only one containing reliably stratified occupation levels. These are earlier than the circular structure, which is of uncertain date. Levels 3, 2 and 1 seem to represent an area of mixed activities. A line of stones across the centre of the trench may be part of a contemporary structure.

Phasing

Levels relate only to individual soundings and have not been correlated across the site (Table 2.1).

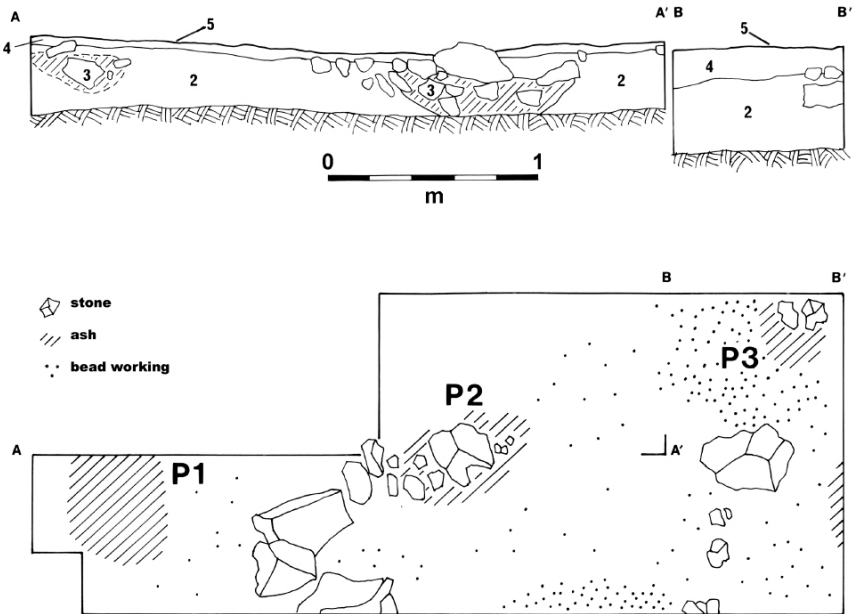


Figure 2.4 Jebel Naja: trench 400, plan and section

Phasext
Level 5: 101; 107; 108; 110
Level 4: 102; 112; 114; 105
Level 3: 103; 106; 109; 115

Level 2: 104; 113
 Level 1: 111; 116
~~Level 3: 201~~
 Level 2: 202; 203
 Level 1: 204
~~Level 3: 301~~
 Level 2: 302
 Level 1: 303; 304; 305; 306
~~Level 5: 401; 402; 412; 415~~
 Level 4: 403; (412); (415)
 Level 3: 404; 405; 408; 411; 414
 Level 2: 406; 407; 409; 410; 413; 416
 Level 1: 417

Table 2.1 Jebel Naja: contexts by phases

Special finds

All the special finds from the site came from the bead-working area in 400 (Table 2.2). They included raw material, blanks and complete beads in a variety of raw materials.

Chipped stone

INTRODUCTION

The chipped stone (Figs 2.5–2.9) was initially analysed by Betts, but the sections below, excepting ‘Tool typology’, have been reworked by McCartney to aid comparison with her analyses of the Burqu’ sites (Chapter 3).

<i>Description</i>
2021 bead
2101 bead 405 3 Pink stone bead
2106 pink stone bead
2106 pink stone bead
2116 stone bead
2106 brown/pink stone bead
2106 green bead
2106 pink stone bead
2106 pink stone bead
2106 pink stone bead
2116 stone bead
2106 grey/pink stone bead
2106 anticular stone bead
2106 stone bead
2106 green stone bead
2106 green stone bead
2106 pink stone bead
2134 fragment, pink stone
2134 fragment, pink/red stone
2134 fragment, pale pink/grey stone
2134 fragment, pink and cream stone
2134 fragment, pink stone, possibly part of 22

Table 2.2 Jebel Naja: special finds

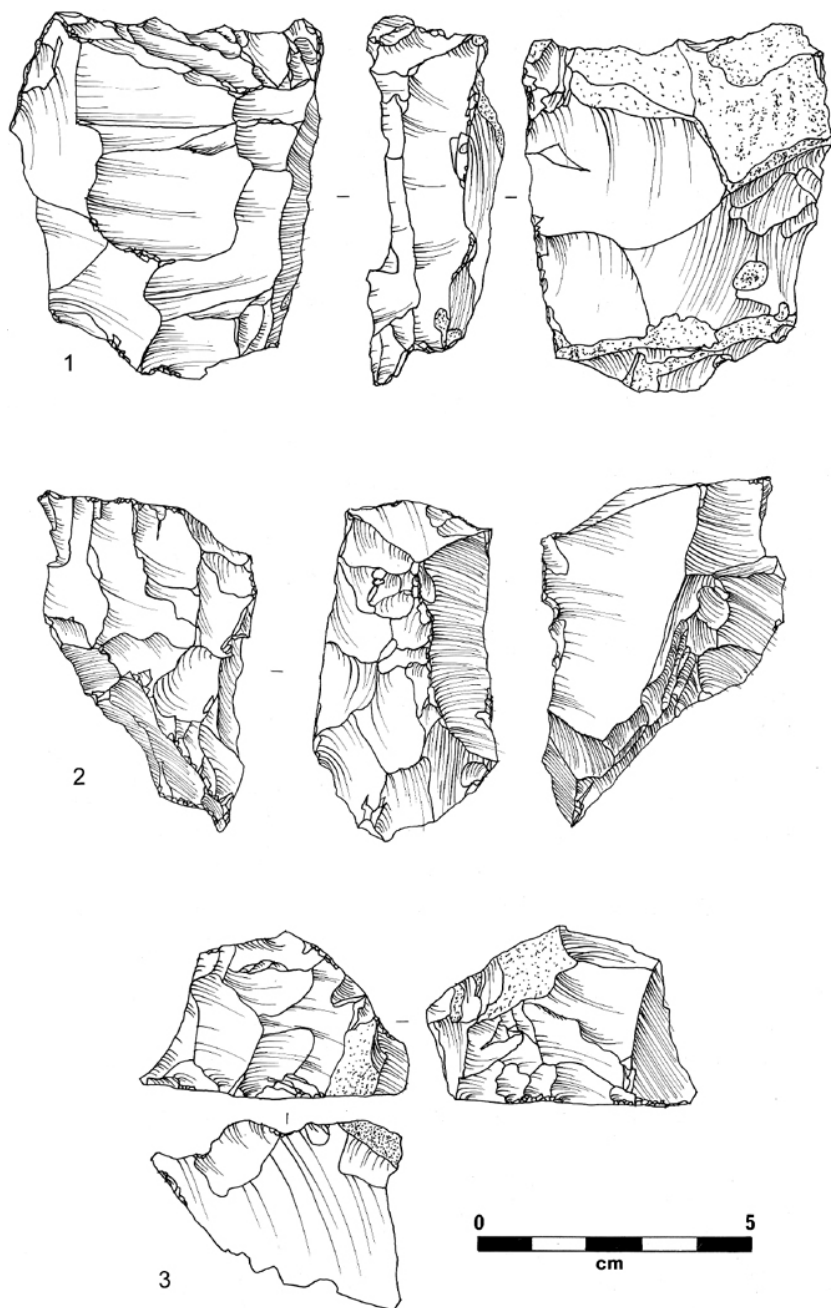


Figure 2.5 Jebel Naja: chipped stone. 1. Changed orientation flake core; 2. Single platform

blade core; 3. Single platform flake core

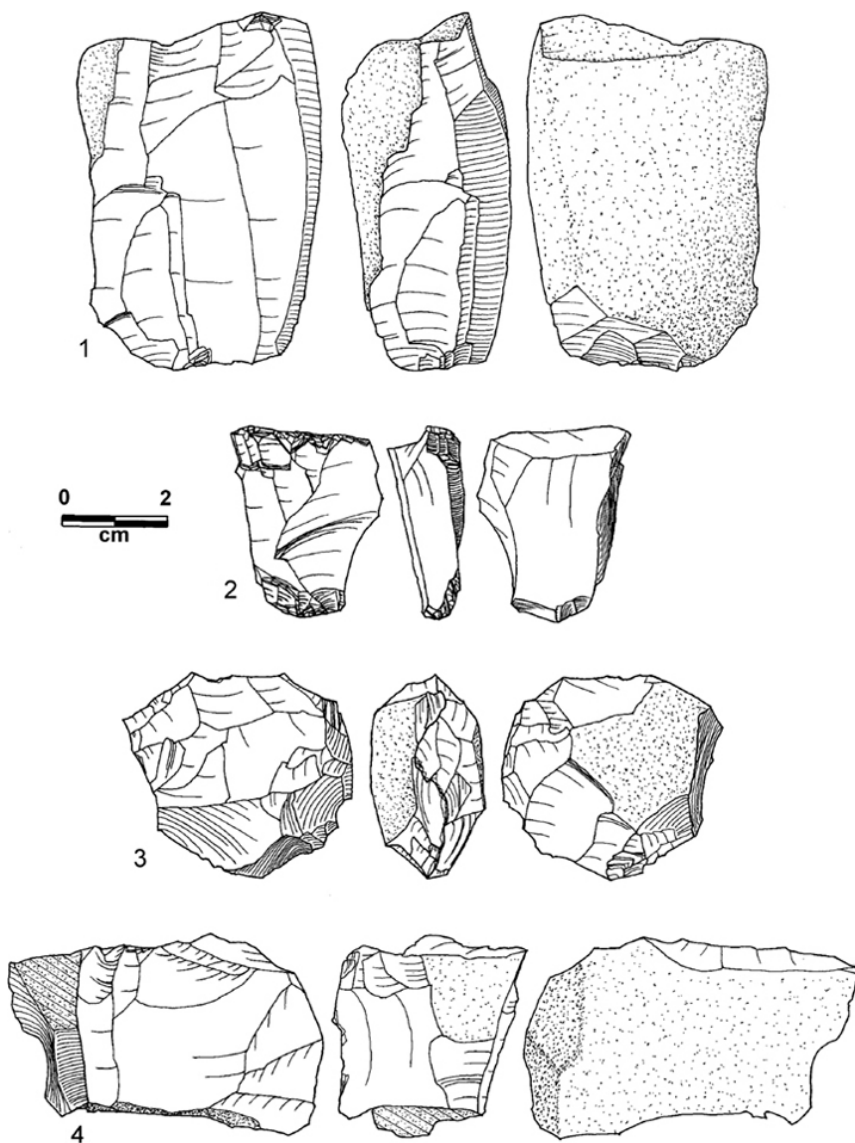


Figure 2.6 Jebel Naja: chipped stone. 1. Opposed platform core; 2. Splintered core; 3. Discoidal core; 4. Crossed platform core

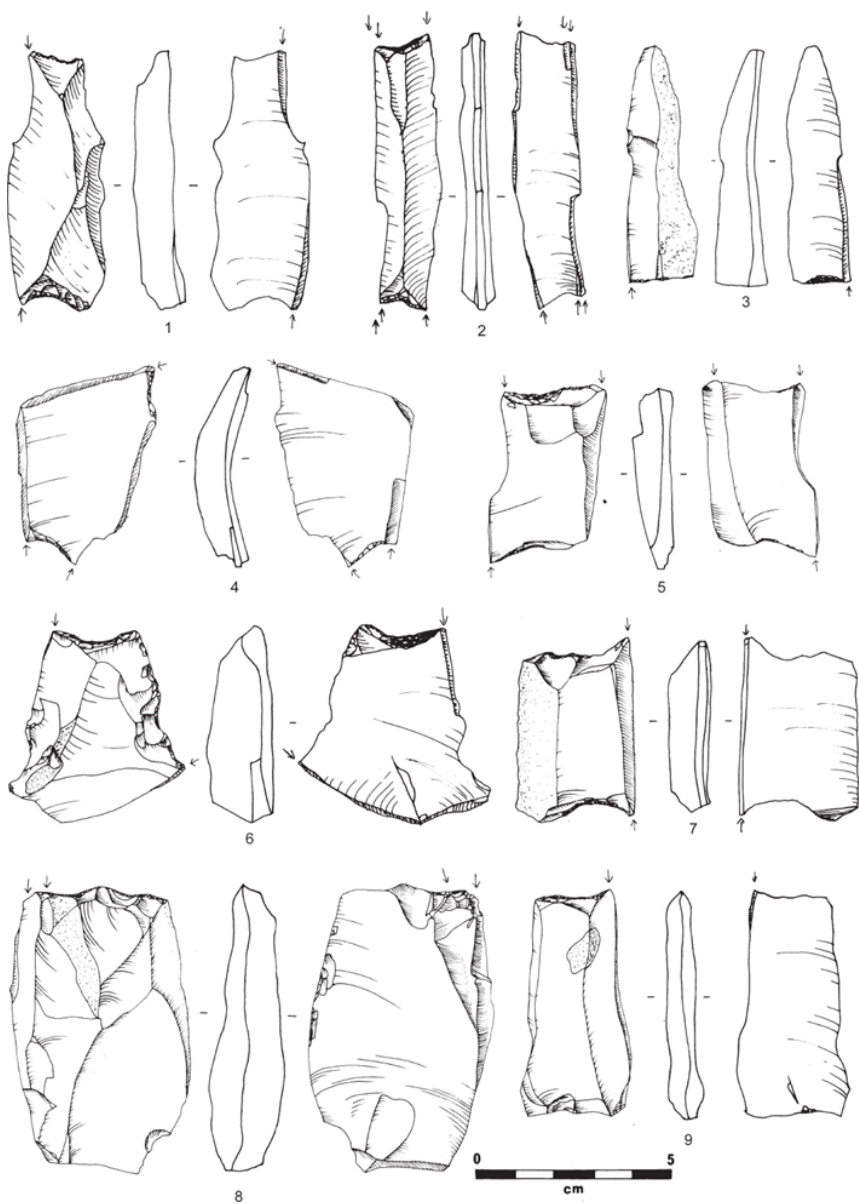


Figure 2.7 Jebel Naja: chipped stone. 1–9. Concave truncation burins

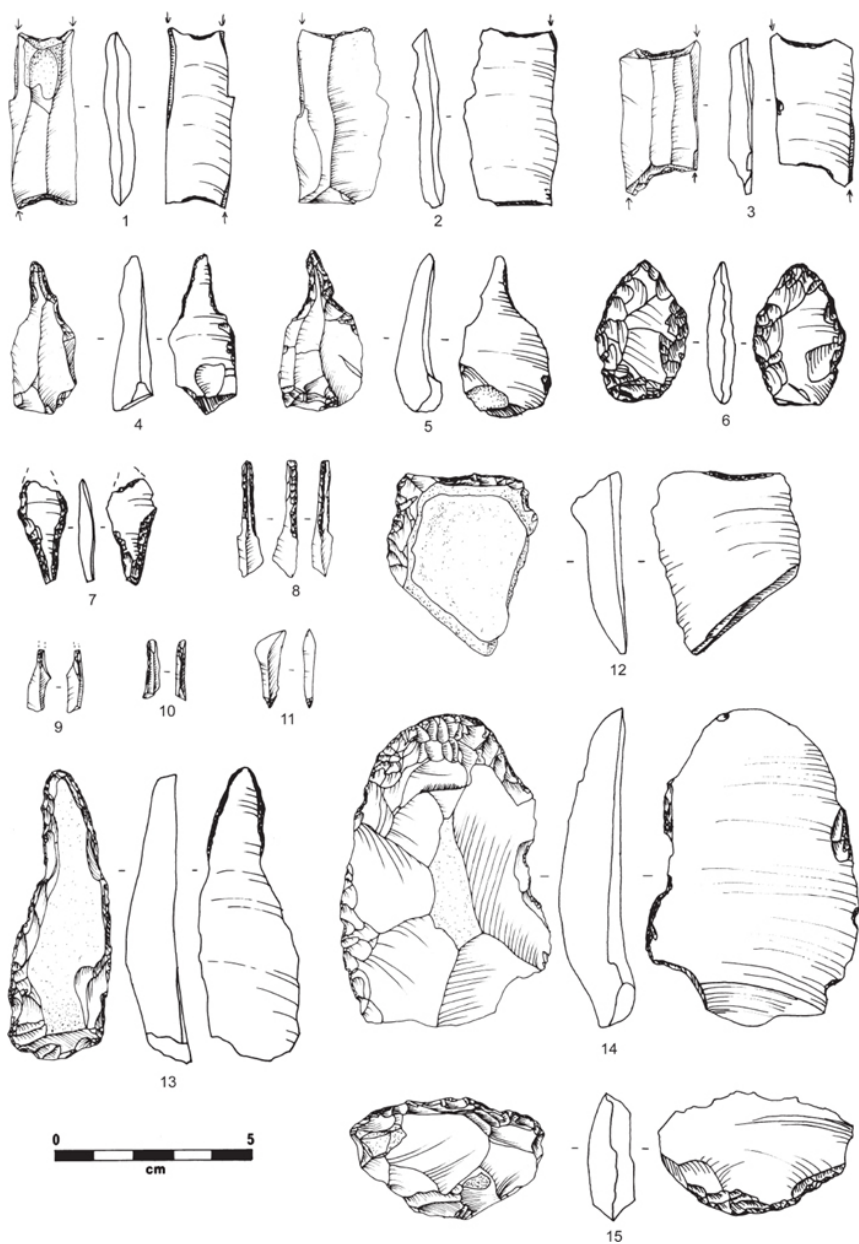


Figure 2.8 Jebel Naja: chipped stone. 1–3. Concave truncation burins; 4,5,13. Borers; 6. Bifacial piece; 7. Herzliyah Point; 8–11. Drills on spalls; 12. Tabular scrapers; 14. End scraper; 15. Flake scraper

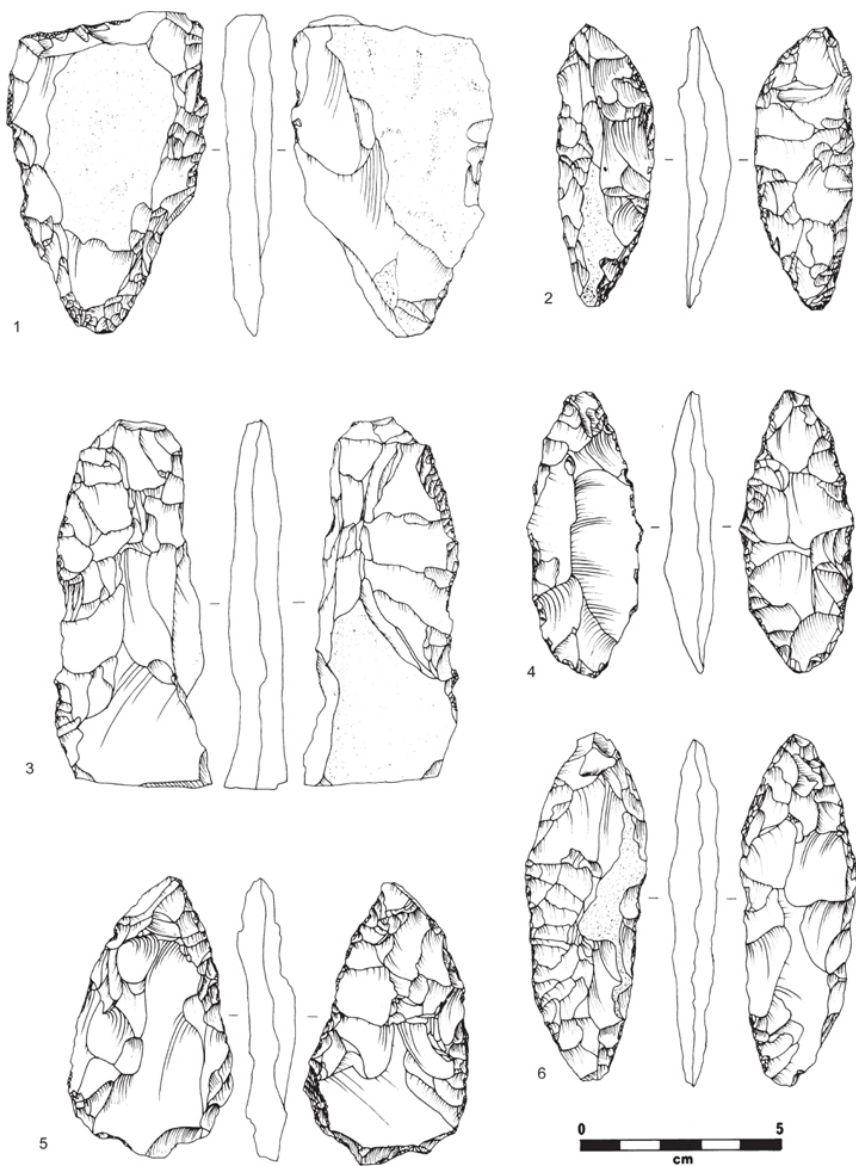


Figure 2.9 Jebel Naja: chipped stone. 1, 3. Tile knives; 2, 4, 5, 6. Foliate bifaces

	1	2	3	4	5	6
Cores	38.00	33.00	3.00	7.00	11.00	5.00
%	39.18	34.02	3.09	7.22	11.34	5.15
Blanks	52.00	13.00	12.00	8.00	11.00	4.00
%	52.00	13.00	12.00	8.00	11.00	4.00
Total	90.00	46.00	15.00	15.00	22.00	9.00
%	45.69	23.35	7.61	7.61	11.17	4.57

Table 2.3 *Jebel Naja: raw material quality*

RAW MATERIAL

The raw material for the assemblage comes from the extensive surface scatters and exposed chert beds on the hillslope below the basalt plateau, and is a distinctive local variety of medium-grained chert ranging in colour from brick red to pale rose with cream bands. Lighter shades of buff, grey and greenish brown also occur. Some pieces have chalky inclusions.

Raw material quality is summarized in Table 2.3. In general, the raw materials utilized at Jebel Naja represent the locally available better-quality cherts (76.7% belonging to chert types 1 to 3), in contrast to those used at the Burqu' sites. Material of similar quality was used at the hunting site of Dhuweila (Betts *et al.* 1998) and appears, therefore, to be characteristic of the western edge of the *harra*. The use of such high-quality material would have facilitated the production of diminutive burin spalls that characterize the debitage sample (Betts *et al.* 1998); it is notable that better-quality cherts were employed more frequently at the earliest of the Burqu' sites, 35000 and particularly 03000, where burin spalls were also produced in large numbers (see Chapter 3). Relatively few blank butts showed evidence of crushing (4.0%), but blank butts were more frequently marked by ring cracks (32.0%) than those of the Burqu' samples, a feature that is consistent with the greater use of higher-quality raw materials. The Jebel Naja assemblage shows consistent patterns in raw material types across both the core and blank samples, suggesting that material demands were easily met by the extensive local chert scatters on the hillslope below the basalt plateau; this feature had no doubt played a role in the choice of site location.

Like that of Burqu', the favourable location of Jebel Naja afforded the occupants abundant supplies of local raw materials for the production of chipped stone tools. The site itself lies on an extensive chert outcrop, though it is evident that the Neolithic knappers also reutilized Levallois cores from the Palaeolithic scatter adjacent to the site, which is indicated by the presence of the patina category in the list of cortex types shown in Table 2.4. The double patination is quite marked and easy to identify in these examples. The distribution also shows that a greater proportion of tabular chert was used at Jebel Naja (and at Dhuweila) than at the

Burqu' sites, indicating that use of tabular chert was more characteristic of the western edge of the *harra* than within the area of the Burqu' lake.

	<i>Tabular</i>	<i>Cobble</i>	<i>Wadi- pebble</i>	<i>Patina</i>	<i>None</i>
Cores	12.00	60.00	8.00	12.00	5.00
%	12.37	61.86	8.25	12.37	5.15
Blanks	15.00	39.00	0.00	18.00	28.00
%	15.00	39.00	0.00	18.00	28.00

Table 2.4 Jebel Naja: cortex types

N	
2810	
342	cores and core trimming elements
347	
100	
306	
1	

Table 2.5 Jebel Naja: total assemblage count

N	
607	
617	flint
324	
176	e-1
176	e-2
232	e-3
162	e-1
131	e-2
165	e-3
100	delet-1
116	delet-2
173	delet-3
167	fragment
114	form rejuvenation
90	inter platform rejuvenation
127	
117	shot
100	tablet
100	and core fragment
100	

Table 2.6 Jebel Naja: artefact types – core reduction

ARTEFACT COUNTS

The artefact type counts listed in Table 2.6 are based on a sample of the total assemblage studied by McCartney in conjunction with the analysis of the Burqu' site core technology. The sample was studied following the initial analysis by Betts, after which the bulk of the chips and angular debris were discarded. The numbers given for these artefact types, therefore, are under-representative of their true proportions in the total assemblage collected from the site (Table 2.5). All complete blanks were counted according to blank type and the presence or absence of dorsal cortex. The presence of low numbers of completely cortical blanks in each of the flake, blade and bladelet categories as well as the presence of numerous cores and core trimming elements in the sample attests to on-site blank production (Table 2.6). The relative scarcity of core trimming elements associated with more complex core reduction methods (crested blades and core tablets) supports the characterization of the assemblage as representative of the simple core technology generally associated with the Late Neolithic. Cores represent a relatively small proportion of the total assemblage, and the blank to core ratio (13.3:1) is very high, exceeding that of the samples from the Burqu' area. The significant percentages of blanks and tools in the assemblage show a prolific amount of core reduction at the site, with surprisingly heavy exploitation of large individual cores given the abundance of locally available raw material, suggesting that core economy and raw material availability are not necessarily correlated.

<i>Blank type</i>
6950
8080 /bladelet
5240
<i>Tool blank type</i>
6914
8247 /bladelet
5391
0100
0018

Table 2.7 Jebel Naja: blank type utilization

The production of the various blank types and their selection for use in tool manufacture are illustrated in Table 2.7. Despite its Late Neolithic date, the industry at Jebel Naja still depended on a significant number of lamellar blanks for tool production. The average blank dimensions listed below, however, suggest that blanks belonging to Jebel Naja were typically shorter and wider than the long blades produced during the PPNB. The ideal blank for burin production was an elongated flake or thick blade, though there is little evidence for the careful selection of blanks for tool production, as burins occur on a wide variety of oddly shaped pieces. It is significant that the blank type data for Jebel Naja shown in Table 2.7 fit closest to the early Burqu' sites of 35000 and especially 03000, where significant numbers of both blades/bladelets and spalls were also produced (see Chapter 3).

CORE REDUCTION METHODS

Cores with no explicit platform configuration dominate the core sample (Table 2.8), representing a contrast with the organization of the core technology at both Late Neolithic Dhuweila and Burqu’ (Betts *et al.* 1998, table 4.10; Chapter 3). Similarly, cores-on-flakes and evidence for the use of the bipolar-on-anvil technique are virtually absent. In contrast to the high blank to core ratio, the percentage of exhausted cores in the sample (43.3%) is relatively low compared to many of the Burqu’ samples. A greater percentage of the Jebel Naja cores were discarded as the result of deep hinge terminations (31.6%) and overly obtuse core platforms (10.3%), features which support a characterization of the assemblage as more haphazard in comparison to those of the Burqu’ cluster. Comparatively few cores were discarded because of small size (19.6%), in contrast to the Burqu’ samples, where this was a constant characteristic. Similarly, average core dimensions are considerably larger than those found either at Burqu’ or Late Neolithic Dhuweila, confirming the lack of an intensive core economy at Jebel Naja.

Core type
Alternating platform
Amorphous
Edge-of-orientation
Isodolal
Core-on-flake
Exposed platform
Single platform
Entered piece
Maximum dimensions
44.08 mm
Thickness

Table 2.8 Jebel Naja: core types

Butt type
Compression
Core
Dihedral
Notched
Butt
Butt plain
Blank dimensions
26.79 mm
Thickness
Blank width
Blank thickness

Table 2.9 Jebel Naja: butt types

Technological consistency is demonstrated between blank types and the Jebel Naja core sample by the significant number of cores that exhibit blade/bladelet scars (49.5%). Though this feature was less prevalent than at Late Neolithic

Dhuweila, the percentage given here corresponds well to the values for Burqu’ 35000 and 03000. The consistency of these data implies that the knappers of Jebel Naja continued to pursue a reduction strategy aimed at the production of significant numbers of lamellar blanks, in spite of the shift to greater overall numbers of flakes as recorded for Later Neolithic assemblages generally.

BLANK VARIABLES

Butt types shown for the sample of blanks measured in the present analysis demonstrate the frequent use of a flat cortical surface as the striking platform. The high percentage of fully cortical butts in the Jebel Naja sample (Table 2.9) (and those of the Burqu’ sites) contrasts with the industry of Late Neolithic Dhuweila, where blank platforms were more carefully prepared (Betts *et al.* 1998, 83–6). This distinction between Dhuweila and Jebel Naja supports the greater similarity becoming apparent in the organization of the core technologies in the assemblages from Jebel Naja and, on the opposite edge of the *harra*, from Burqu’.

Scar pattern
Unidirectional
Cortex
Used
Radial
Unidirectional

Table 2.10 Jebel Naja: dorsal scar patterns

The evidence for ring cracks implies direct percussion with the use of a hard hammer, which agrees with the greater prevalence of salient bulbs (49.0%) shown on ventral surfaces in the blank sample. These data are contradicted, however, by the significant number of blanks with a ventral edge lip (48.0%) and significant presence of diffuse ventral bulbs (42.0%), features which are traditionally used to suggest the use of a softer hammer during core reduction. It is likely, however, that the latter features are at least partly the result of cortex being present on striking platforms.

Average blank dimensions show that the blanks produced at Jebel Naja are larger than their Burqu’ counterparts. This data correlates well with the core dimensions listed above. It also demonstrates the close correspondence between the size of the locally available raw materials and the blanks produced, which are both more diminutive at Burqu’ in spite of the common desire for the production of relatively robust blanks.

The dorsal scar patterns shown for the sample of blanks measured for Jebel Naja (Table 2.10) define an assemblage dominated by the systematic use of unidirectional core reduction, in contrast to the more *ad hoc* characterization indicated by the core sample. Indeed, a prior sample showed unidirectional knapping to be as high as 84.0% (Betts 1986, fig. 5.3). Though unidirectional patterns can be produced from a variety of core types, it is likely that the common amorphous cores listed in Table 2.8 were made by the frequent recycling of previously single platform and change-of-orientation examples.

(Tables 2.11 and 2.12)

Arrowheads: Four arrowheads were found at Jebel Naja. Three of these came from excavated contexts and one from the surface. The stratified ones included a transverse arrowhead and two Herzliyah points. The unstratified piece was also a Herzliyah point.

Burins: The burin group was dominated by truncation burins, most commonly on concave truncations. Many were truncated at both ends of the blank and had multiple removals. Other forms of burin occurred in low numbers.

<i>Tool type</i>	<i>Excavated</i>	<i>Surface</i>	<i>Total</i>
Arrow	3	1	4
Burin	877	149	1026
Scraper	38	23	61
Biface	7	7	14
Tile knife	9	9	18
Borer	3	2	5
Drill	51	1	52
Misc. retouch	93	11	104
Total	1081	203	1284

Table 2.11 Jebel Naja: major tool groups

<i>Excavated</i>
Arrowhead
Herzliyah
Transverse
Burin
Concave break
Truncation
Bihedral
Nucleiform
Multiple mixed
Broken
Scraper
Flake
Tabular
End
Side
Benticulated
Biface
Poliate
Other
Tile knife
Borer
Drill

Drill on spall
Drill, other

Table 2.12 *Jebel Naja: retouched pieces*

Silica gloss: No pieces with silica gloss were found at the site, either on the surface or in the soundings.

Scrapers: Scrapers were made mostly on apparently randomly selected flakes. In most cases the nature of the blank dictates the form of the tool. Many were roughly retouched, but some were more carefully prepared and fall into recognizable classes – side scrapers, denticulated scrapers and end scrapers.

Bifacial pieces: The bifacial pieces are foliate in form and made on thin plaques of tabular flint with retouch over almost the entire surface. Flaking scars, which are broad and shallow, were created by invasive subscalar bifacial working.

Tile knives: Tile knives were made on thin slabs of tabular flint. They are wide and somewhat roughly made, with shallow, semi-invasive retouch.

Borers: Borers were made on flakes and elongated chunks. They are fairly thick. Some seem to have been worked along the body of the piece to make them easier to hold.

Drills: Most of the pieces in this class are drill bits on burin spalls. These have fine traces of wear or secondary retouch at one end, not necessarily the tip. Some are rounded and smoothed by use.

SUMMARY

The Jebel Naja assemblage is representative of what has been termed the ‘burin Neolithic’. This is a general term for sites with a very high proportion of burins, specifically concave truncation burins, in the assemblage. The term simply describes particular types of sites, not a specific industry. The sites are probably distinct in archaeological terms because of the limited range of specific activities with which they may be associated. Knapping techniques, tool types and relative proportions of retouched pieces are all paralleled at a great many sites elsewhere in the *harra* (see ‘Late Neolithic sites in the *harra*’, p. 179). Certain tool forms, notably the bifacial pieces and arrowheads, have parallels at Late Neolithic sites in Syria/Palestine. These fit with the single late-7th-millennium cal. BC date obtained for Jebel Naja. Less clear, however, is the relationship between these ‘burin Neolithic’ assemblages and that of Late Neolithic Dhuweila 2 (Betts *et al.* 1998). Similar tool types occur in both assemblages, but the Dhuweila assemblage is much more varied (Betts *et al.* 1998, 59–119); and while knappers at both sites made use mostly of medium-quality locally available raw material the Dhuweila tools are much more finely worked, more care was taken in blank selection for specific tools, and many pieces are skilfully shaped through fine pressure flaking. This is in marked contrast to the Jebel Naja assemblage, where tools appear to have been produced very much on an *ad hoc* basis.

Another problem is that of the date range for the ‘burin Neolithic’. At Wadi Jilat, to the west of the *harra*, truncation burins have been found in relatively high proportions in contexts dating to the mid-8th millennium BC, together with pieces typical of Pre-Pottery Neolithic industries such as Byblos points and naviform cores (Baird 1993). Some of the burins are on blade blanks struck from bipolar cores. Baird has thus recommended caution in grouping together sites with high

proportions of truncation burins under one label (Baird 1993). However, the Jebel Naja assemblage – along with those of other ‘burin Neolithic’ sites – is distinctive, and contains no hint of Pre-Pottery Neolithic elements. All diagnostic parallels are with the Late Neolithic, and the radiocarbon date for Jebel Naja reinforces this lithic evidence. One point which should be considered is the relationship between the ‘burin Neolithic’ sites and the PPNC stage identified at ‘Ain Ghazal (Rollefson and Simmons 1986). Technological analysis of the chipped stone from the PPNC stage at ‘Ain Ghazal has shown that the increasing use of unidirectional cores, less sophisticated knapping techniques than in PPNB assemblages and an increase in natural backing and cortical platforms were characteristic of the later industry (Rollefson and Abu Ghunima 1983). This trend has been more closely documented by Cropper (2006) in a detailed study of the development of Late Neolithic chipped stone industries in and around the Jordanian *badia*.

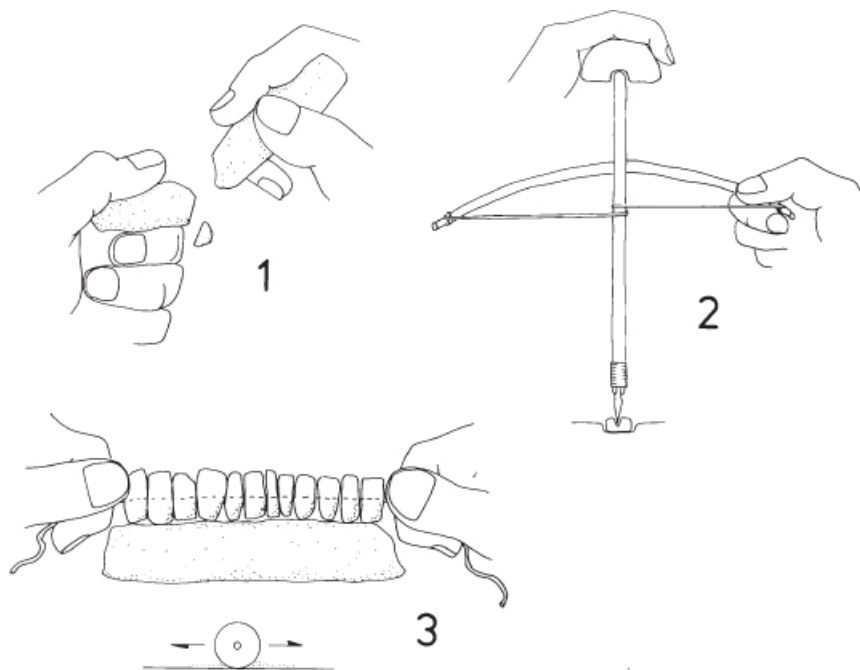


Figure 2.10 Jebel Naja: suggested techniques for bead making

Faunal remains

by A. N. Garrard

A small quantity of bone was recovered from stratified contexts in Trench 400. Four specimens of *Ovis/Capra* sp. were found, one of which is definitely *Capra* sp. (Phalange 3), and two of which appear from fragmentary remains to be *Ovis* sp. (Phalanges 2 and 3). The fourth fragment, a tibia, could belong to either genus. It is impossible to say from the morphology whether or not these belonged to domesticated animals. Two fragments of *Lepus* cf. *capensis* were found, one from a

calcaneum and the other from a tibia. Three fragments of *Gazella* sp. from metatarsals and an ulna were recovered.

Shells

by D. S. Reese

Two marine shells were recovered from the soundings at Jebel Naja. Both are gastropod apical beads and both are sufficiently worn that it is not possible to determine genus or species. SF 7 (context 407) had a diameter of 7 mm and a hole 2 mm in diameter; SF 8 (context 413) had a diameter of 7 mm and a hole 1 mm in diameter.

Bead-working

by L. Cooke

METHODOLOGY

Each complete bead was catalogued, drawn, weighed and measured. In addition, all fragments of stone weighing more than 0.05 g thought to be associated with bead manufacture were also recorded in detail. Surface material has been included in the analysis. All linear measurements are in millimetres. For beads and bead fragments figures are given to one decimal place, and for miscellaneous fragments to 0.5 mm. Measurements correspond to the greatest extent in any one plane and the greatest diameter of any hole. A dial caliper (Rabone) was used. Weights are given in grams rounded to two decimal places. Digital (electronic) scales were used. Beck's terminology was used as the basis for analysis and description of the pieces (Beck 1928).

TERMINOLOGY

~~Diameter~~ less than 1/3 diameter

~~Short~~ more than 1/3 diameter, less than 9/10 diameter

~~Standard~~ more than 9/10 diameter, less than 11/10 diameter

~~Long~~ more than 11/10 diameter

~~Maximum~~ width of transverse section

~~Perforated~~ (lines) bordering the transverse (cross) section

~~Surfaces~~ that are perforated (when approximately flat or concave)

~~Cylindrical~~ approximately flat ends

~~Beveled~~ flat ends that meet a curved profile at an angle

~~Perimeter~~ of two curved lines, approximately arcs of circles which meet at opposite points

~~Curved~~ profile that extends to the perforation

ANALYSIS

The stone fragments were grouped according to size and shape and examined for evidence of deliberate striking (knapping) and pressure flaking in the reduction process. Beads were examined for indications of drilling and polishing (Fig. 2.10). Pink, green and buff/white were identified as three distinct colour ranges. Occasionally two distinct colours (e.g. pink and cream) were visible within one fragment. A sample of green and pink fragments was examined under an electron scanning microscope (ESM) to see if macroscopic differences in colour and texture of the stone were significant. Hardness tests (Mohs scale) were done on a few

representative fragments. None of the stone in this study occurs naturally on the site and it is assumed that it was brought in deliberately for the purpose of bead-making.

THE BEADS

There are nine whole beads and fragments of six beads showing a hole and a rounded perimeter (Fig. 2.11; Table 2.13). One truncated biconical bead of lenticular cross-section is faceted. Other bead types represented are cylinder and barrel beads, including all length to diameter ratios specified by Beck: disc, short, standard and long. Eleven beads or fragments of beads fall within the colour range described as pink and four within that of green. There is one black bead, which is considerably smaller than any other and of an unidentified raw material.

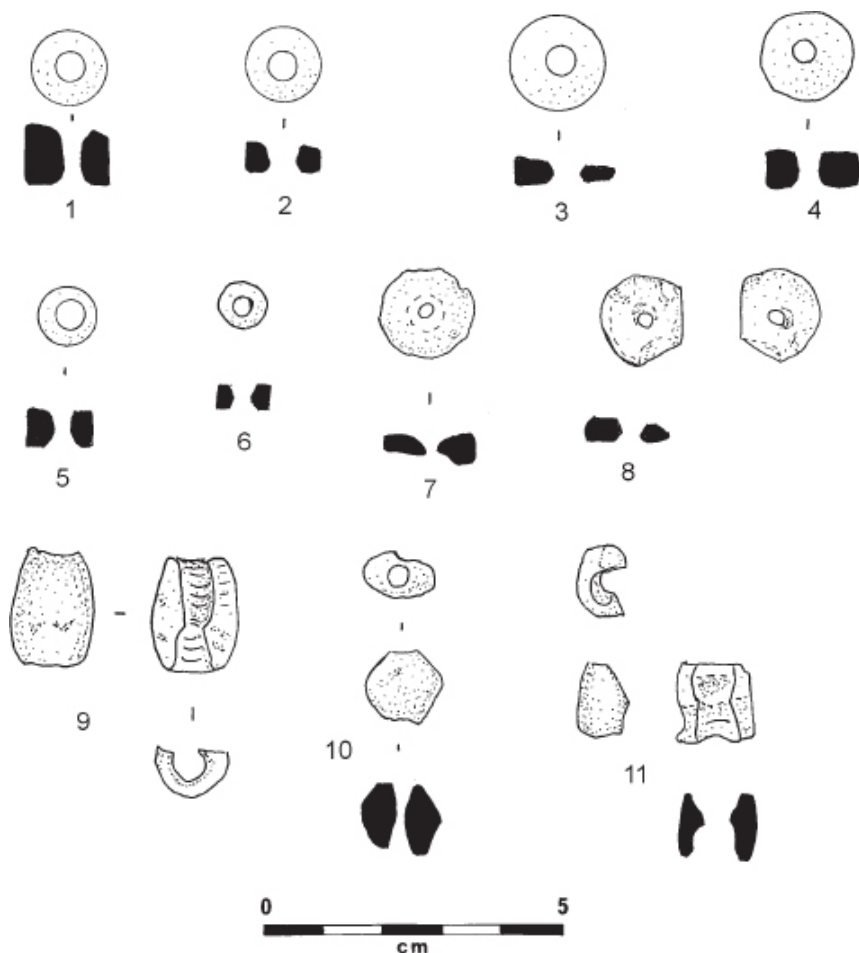


Figure 2.11 Jebel Naja: complete beads

All the beads have only a single perforation, in each case apparently drilled from both ends, although in the finished beads the 'hour-glass' effect is not clearly visible. Two of the green beads have distinct rounding of the end near the perforation (here termed 'bevelled'). The end/perforation meeting is more rounded than angular and therefore does not meet Beck's description of 'chamfered'. Other beads may have a slight indentation near the hole. The process of perforation followed by percussion described by Chevalier *et al.* (1982) would not be possible with the Dabba marble used here because it is not as hard as carnelian (7 on the Mohs scale) and the crystalline structure is too fibrous.

A number of pieces were beads abandoned in the process of manufacture. Six pink fragments (of which two are probably from the same bead) have holes. In four of these, the perforation was misaligned or incomplete. The perimeters of these pieces are angular rather than round. It seems clear that they represent unsuccessful attempts to make beads. One green fragment has been chipped/fractured on two sides of the hole, which is intact. This is an unusual and unexpected way for a bead to break; it is unlikely that natural faulting should be so precise and this specimen may have been an attempt to make a bead of lenticular cross-section. However, it had either flaked off one end or was intended to be a disc bead as its length is only 2.4 mm.

Among the bead blanks or roughouts are eight pink polygonal or hexagonal fragments that appear to have been deliberately shaped (perhaps by pressure flaking) in preparation for drilling, although drilling has not been attempted. There is also one green fragment that does not fall into a size or shape range similar to the other blanks. However, it appears to have been deliberately snapped at one end, leaving a slight protrusion, and there are indications that it had been intentionally shaped. It is unlike any other fragment and is therefore in a category of its own as a possible blank.

Dijmanfinds

Disc beads

Fig. 10.111B, striations in hole, hourglass, bevel one side, one flat surface

L 2.3 mm

DH 1.2 mm

W 0.17 g

Fig. 10.111C, beveled hourglass, bevel both sides, bead faceted and rounded, hole not central

L 2.4 mm

DH 1.6 mm

W 0.18 g

Fig. 10.111D, bevel both sides

L 5.4 mm

W 0.12 g

Fig. 10.111E, holes angled relative to each other

L 1.7 mm

DH 1.7 mm

W 0.13 g

Short cylinder beads

Fig. 10.111F, hourglass, slightly asymmetric, some working still visible, holes angled relative to

Fig. 10.111G, another

DH 12.0mm

W 0.3 g

fall broadly into three colour categories: a pink range which includes red, a strong rust colour, rose pink and pale brown; green, both dark and a lighter, brighter 'eau de nil' colour; and white/buff, which may be whitish all through or pale buff with a very white surface. By far the greatest proportion is pink (90.0% numerically, 85.0% by weight). Some fragments have rounded, eroded surfaces while some have very sharp, angled edges; it is perhaps impossible to distinguish clearly between waste and raw material.

The pink stone may be a form of calcite which occurs locally on the edge of the *harra*. The possible calcite fragments vary in minerals included, as does the colour. There is also a variation in the fineness of the grains, ranging from very fine to much coarser with sand inclusions (but not sandstone). Some pieces are coated with a fine layer of halite (rock salt) and some are overlain by macroscopic crystals of halite. The hardness of the pink stone is no more than 3 on the Mohs scale, even in fragments that appear to have been knapped. A few small fragments are very friable, and have disintegrated into dust or crumble on the surface when touched. Others show hairline cracks and faults.

The green stone is 'Dabba marble', a specific form of apatitic limestone occurring around fossil springs some 100 km west of Jebel Naja. It is sourced from the area around Wadi Dabba, approximately 50 km south of Amman and 20 km west of Wadi Jilat (Hauptmann 2004, 174; Wright and Garrard 2003, 270). It also occurs more rarely in pink shades (Baird *et al.* 1992, 24; Wright *et al.* 2008). Both the dark green specimens and the 'eau de nil' pieces that were examined proved to be apatite (calcium phosphate). The difference in colour and structure that is apparent to the naked eye is largely due to the way in which the crystals lie. Interestingly, traces of pink can be seen on at least two of the green fragments. When examined under the ESM both apatite and calcite could be seen in the same fragment; in one case the latter appeared to be coating the apatite crystals. The apatite is 5 on the Mohs scale.

All the beads, bead fragments and possible blanks were found in Trench 400, together with 98.0% (95.0% by weight) of the rest of the material. Three relatively large fragments, twelve smaller ones and a number of chips were found on the surface.

DISCUSSION

Most of the blanks and partially worked fragments show no clear indications of working methods. Some have indications of conchoidal fracturing, but in most cases this was probably caused by random blows intended to fracture the stone, rather than by deliberate shaping. The small size of the beads would also make direct percussion a difficult task. It is possible, however, that pressure flaking was used to shape the blanks into the consistently hexagonal shape found. Small indentations around the circumference of the partially made beads and blanks suggest that this may be a possibility.

The raw material for bead-making was imported to the site. The 'Dabba marble' was brought a distance of almost 100 km, while the source of the pink stone is not known. No large pieces of raw material were found either during excavation or on the surface. It is possible that the material was roughed out at source and transported in small pieces or that the larger waste pieces were collected up for reuse.

The beads show signs of having been drilled using a mechanical device rather than by hand. The holes are symmetrical and show striations consistent with mechanically aided drilling (R. Grace, pers. comm.). A bow drill employing a reed or thin stick hafted onto a spall or flint sliver is perhaps the most likely tool. The worked spalls from the site were probably involved in the drilling process. Experimental use of a burin spall as a drill bit for piercing soft limestone produced similar wear on the edges of the pieces. The beads were worked from both sides to the middle, in most cases producing a classic 'hour-glass'-shaped hole in cross section. Where the holes were not drilled from exactly the same point on either side of the bead the hole is slightly asymmetrical.

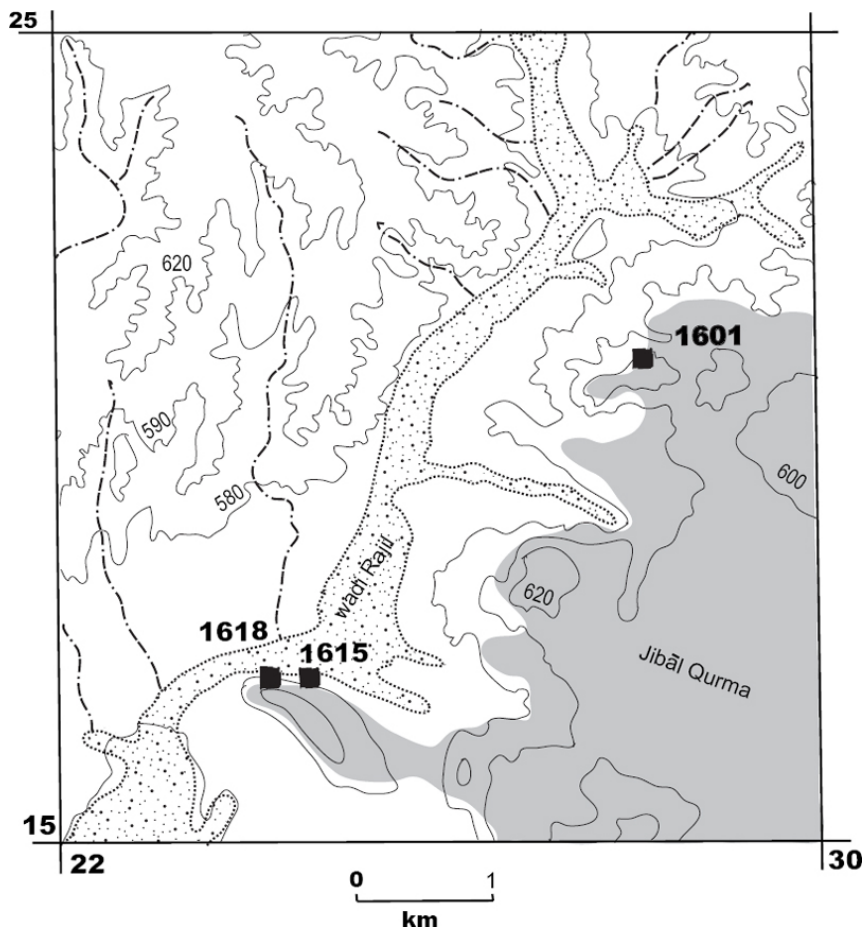


Figure 2.12 Jebel Qurma: site location map

After drilling, the beads were polished. The complete beads had a rounded and relatively shiny surface. They also show microscopic scratches consistent with polishing. The method employed is not known but a well-documented technique is

illustrated in Fig. 2.10. The drilled beads are strung together and rolled over an abrasive surface with further loose abrasive sprinkled over the pieces. The action of the blanks rubbing against each other smooths the flat surfaces, while the rolling action smooths the curved outer surfaces. Sand would have served adequately as a suitable abrasive.

The small size and symmetry of the beads points to a considerable degree of skill in bead-making, while the restricted area in which the beads were found suggests a workshop site. It is not clear, though, whether the finds represent a single day's work or whether the spot was reused on more than one occasion, with the materials possibly being stored there when not in use.

Beads are known from almost every Neolithic site in the Levant, but only a few sites have provided evidence for *in situ* manufacture (Garfinkel 1987; Baird *et al.* 1992, 25; Wright and Garrard 2003; Wright *et al.* 2008). Given their prominence in the material culture of the steppic Neolithic, beads were clearly socially significant. They were presumably used for ornament and possibly also as a means of exchange. Within the *badia* they provide evidence of cultural connections across the steppe. The raw materials and methods of manufacture, in particular the use of burin spalls as drills, are effectively the same at Jebel Naja and in Wadi Jilat (Baird *et al.* 1992, 25; Wright *et al.* 2008).

ACKNOWLEDGEMENTS

I would like to thank Monica Price of the University Museum, Oxford, Derek Roe of the Douglas Baden-Powell Quaternary Research Centre, University of Oxford, and the staff of the Herberden Coin Room at the Ashmolean Museum for assistance with the analysis. I would also like to thank my husband for his tolerance while this work was in progress at our house.

Jebel Naja in context

Jebel Naja is one of a great number of similar sites located all around the edge of the *harra*, particularly in the 'Qurma Gap', a roughly oval gravel plain bounded to the south by a curving line of isolated basalt-capped peaks and linked to the oasis of al-Azraq by the lower reaches of Wadi Rajil, which passes under Jebel Qurma at the western end. To the north lies the *harra* proper and to the east a route through the basalt is made possible by extensive drifting sands which have covered much of the rocky surface, leaving irregular clusters of black hills and plateaux rising above the ochre-coloured sand. It was this route that was selected by the RAF in the 1920s as an alternative route for the Cairo/Baghdad link when the northern route through Syria became too dangerous as a result of the hostility of the tribes there. The route was even used for a while by the Nairn Bus, the main public transport link between Transjordan and Mesopotamia, a trip which must have been extraordinarily uncomfortable. This western sector of the *harra* margin is particularly rich in Late Neolithic sites, specifically those of 'burin Neolithic' type. There are a number of mudflats whose margins provide fairly extensive grazing, and water would have been available in winter and spring from pools in the wadis draining out of the *harra*. The area is frequently used by modern beduin, although the presence of modern wells at Hazim to the west and Qattafi in the east create a different set of circumstances for livestock management.

The excavations at Jebel Naja tell us little about the economy of the people who

lived there, but some things may be extrapolated. The site was not permanently occupied, but used regularly over a period of time. The lack of projectile points implies that hunting was not an important aspect of the economy, while the presence of sheep and goat, although these were not proven to be domesticated, suggest the possibility of a herding camp. This would equate with evidence from elsewhere in the *badia* indicating the introduction of herding as a component in the economy of steppic hunter-gatherers (Martin 1999). The walls and terraces at the site could be of any period, but it is possible that some were enclosures of the Late Neolithic. Elsewhere, microwear analysis has shown that tile knives can be associated with skin-processing, a function which would equate well with their appearance in low but significant numbers on the steppic sites (Verhoeven 1999, 162). The beads and the bead-making work area are an interesting cultural aspect of the 'burin Neolithic'. Neolithic bead production has also been identified at Jilat and al-Azraq, and Wright and Garrard (2003) have discussed the social implications of bead production in the *badia*. The exact function of the concave truncation burins is still unclear, despite a number of studies (e.g. Finlayson and Betts 1991), but at least some of the spalls produced as by-products were used as drill bits to pierce the soft stone used for making beads. This combination of drill on spall and bead production is a feature of sites to the west in al-Azraq and Wadi Jilat from at least the mid-PPNB onwards (Baird 1993), but truncation burins occur in less extreme proportions on these sites. Thus the 'burin Neolithic' sites of the western *harra* have probably developed out of the steppic PPNB tradition of the Azraq/Jilat type. They appear to represent a specialized form of activity site which may appear fully developed only in the Late Neolithic.

Survey sites

A large number of Late Neolithic sites were located during field surveys in the *harra*. These sites are particularly visible because of the extensive lithic scatters that mark them (Table 2.14). Most are also associated with complexes of stone circles and other structures, many of which have seen continuous occupation up to modern times.

Jebel Qurma

BDS 1601 map ref. 3453 IV 207263; BDS 1615 map ref. 3453 IV 179241; BDS 1618 map ref. 3453 IV 180234 Jebel Qurma (Fig. 2.12) is located at the western edge of the basalt at the point where Wadi Rajil breaks through into the Azraq lake bed. It is an isolated basalt-capped group of hills which acts as a prominent landmark; there are many rock carvings and inscriptions on its main summit. A number of 'burin Neolithic' sites were found on the slopes of the hills. The largest, Site 1601, is an extensive complex of huts and terrace walls lying on a north-east-facing slope on the northern side of the Qurma massif, overlooking the east bank of Wadi Rajil. Much of the slope around and below these walls is covered by a thick scatter of chipped stone artefacts. The structures have seen much reuse and rebuilding in the past, although they lie too high up the slope of the hill to be used by the beduin today. Site 1601 is similar to Jebel Naja in many respects, one of which is the degree of reuse and disturbance to which it has been subject, making it impossible to determine whether the flint scatter relates to the structures in any

way. Chert is in abundant supply locally, eroding out of the limestone beds exposed below the basalt on the slopes of Jebel Qurma. Surface collections were made over the whole site but topsoil was not sieved. The analysis includes a general description of cores and blanks and absolute figures for retouched pieces.

Site 1601 is situated on a natural route where Wadi Rajil runs out into the open limestone country to the west of the *harra*. Like Jebel Naja, it is sheltered from the prevailing wind and has a clear view over open country and grazing. Below the site the wadi bed is deeply incised and supports dense shrub vegetation. Upstream it opens out into shallow braided channels (*shaib*). Water would be available for much of the year in pools in the wadi bed. Jebel Qurma is a local landmark and Wadi Rajil is one of the main wadi systems in the *harra*, so the site would probably have been a favoured location and is likely to have been reused on a regular basis. This may account for the extensive artefact scatter over the hillslope. The flint assemblage is very similar to that of Jebel Naja. There is no evidence for traits typical of PPNB flint assemblages and it might be suggested that, like Jebel Naja, Site 1601 was used mainly from the late 7th to the 6th millennium BC, possibly as a short-term camp occupied during the winter and early spring by Late Neolithic herding groups.

Sites 1615 and 1618 are two small flint scatters on the lower slope of Jebel Qurma, a few yards upslope from the wadi bank. There is no evidence of associated structures and the sites both seem to have been single-occupation short-term camps. The flint collections reflect this. In both assemblages, all but one of the retouched pieces were burins. The two remaining tools were scrapers that were roughly formed on irregular cortical flakes. The tools were similar to those from Site 1601; local cherts were used to make short thick blanks, and several of the burins have cortical platforms or natural backing. The similarities to Site 1601 and the absence of PPNB traits suggest that these sites might also be of Late Neolithic date.

The flint assemblage from Jebel Qurma (Figs 2.13–2.14) was similar to that from Jebel Naja. The predominant raw material is banded grey chert from local sources. Cores are irregular, with only limited preparation evident prior to blank removal. In many cases natural fracture planes have been used as striking platforms. The most common forms of blank are short, thick blades and irregular flakes. The use of unmodified chunks of tabular chert as cores has resulted in a high incidence of natural backing. Striking platforms are broad and unfaceted. No bipolar blade cores were found. Only a small number of blanks show bidirectional scars on the dorsal surface, none of which are the regular, sub-parallel scars typical of PPNB blade removal techniques. Tools are fairly large, possibly reflecting the ready availability of raw material. The tool kit is limited in variety: 90.0% of all retouched pieces are concave truncation burins, while other types include bifacial pieces, scrapers, borers and different forms of burins. Most tools are rather crudely made, sometimes on unmodified chunks of chert or thermal flakes. Pressure flaking occurs on only one or two pieces. No drill bits on spalls were recovered, but this may be due to the difficulties of surface collection on ground covered by naturally weathered chert. Many of the concave truncation burins have multiple removals. The scraper class includes end scrapers and side scrapers, but most scrapers are simply irregularly retouched flakes. Several are made on flattish chunks or thermal flakes. Borers are large and thick, and most are on elongated

pieces with a roughly triangular cross section. One pressure-flaked bifacial tool was found. This was snapped across the middle and the spalling scars running from the break suggest that it might have been broken on impact. The end is pointed and the piece might have been used as a spearhead.

Qa' Megalla (qa' Muqalla)

BDS 1630 map ref. 3453 IV 301317; BDS 1634 map ref. 3453 IV 300298; BDS 1636 map ref. 3453 IV 292284; BDS 1640 map ref. 3453 IV 293284; BDS 1641 map ref. 3453 IV 292283; BDS 1645 map ref. 3453 IV 289288; BDS 1647 map ref. 3453 IV 303283; BDS 1648 map ref. 3453 IV 304284; BDS 1657 map ref. 3453 IV 307304

In 1979 a preliminary survey was carried out at qa' Muqalla, a large mudflat on Wadi Rajil (Fig. 2.15) a few kilometres upstream from Site 1601 (Betts 1982). Several 'burin Neolithic' camp sites were located in the area. The sites lie on the lower slopes of a basalt ridge overlooking the mudflat. There are a number of corrals and irregular walls along the mudflat margin, but because these have seen regular reuse right up to modern times it is difficult to determine the relationships, if there are any, between the flint scatters and structures, although in certain cases it seems likely that some of the walls may originally have been built in the Neolithic period. In winter and spring, grazing is plentiful in the area and water is usually available in pools within the wadi bed, but there is no permanent source of water. The 'burin Neolithic' camps along qa' Muqalla are generally similar to Site 1601, being mainly located in sheltered locations against small basalt promontories. The chipped stone assemblages (Figs 2.16–2.18) consist of large numbers of concave truncation burins together with a few irregular scrapers, bifacial pieces and heavy borers. Drill bits on spalls were also found on several of the sites. Site 1630 also yielded a sickle blade and a transverse arrowhead. The flint assemblages, too, are similar to those of Site 1601 and Jebel Naja. The burins are made on short, wide blanks struck mostly from single platform cores. Natural backing and cortical platforms are common. Scrapers, bifacial pieces and borers are made on irregular flakes, tabular chunks and thermal plaques. Although PPNB sites were also found in the area (Betts *et al.* 1998, 200–1), the flint assemblages provide no indication of a relationship between the PPNB knapping sites and the 'burin Neolithic' camps.

Wadi Selahib

BDS 2346 map ref. 3453 I 361337; BDS 2347 map ref. 3453 I 378355; BDS 2348 map ref. 3453 I 381356; BDS 2349 map ref. 3453 I 384355; BDS 2350 map ref. 3453 I 384354; BDS 2351 map ref. 3453 I 374344; BDS 2352 map ref. 3453 I 375345; BDS 2353 map ref. 3453 I 395345 A second group of sites was also surveyed in 1979, in Wadi Selahib, roughly 10 km north-east of qa' Muqalla (Fig. 2.19). The sites are generally similar to those at qa' Muqalla. 'Burin Neolithic' sites occurred together with knapping sites which seem to have been used from the PPNB into the Late Neolithic. The 'burin Neolithic' sites ranged in size from very extensive complexes in and among corrals to small flint scatters. The flint was mostly pale grey with a whitish patina, but varied somewhat from site to site.

Jibal al-Qattafi

BDS 2302 map ref. 3453 I 240551; BDS 2303 map ref. 3453 I 239551; BDS 2304 map ref. 3453 I 240556 Jibal al-Qattafi (Fig. 2.20) is a cluster of isolated basalt-capped hills at the eastern end of the Qurma Gap. Modern wells are located on the mudflat just to the west. The hills include those visited by the RAF pilots in the early years of the 20th century: Maitland's 'Hillfort in Arabia' and Rees' 'Tell A' (Maitland 1927; Rees 1929). Maitland's hillfort has corrals on the summit as well as a line of cairns associated with a Safaitic tomb. On the lower slopes are more tombs, probably of a different date. Tell A had a small multi-period knapping site on the summit and 'kite' walls festooned about the lower slopes. Wadi al-Qattafi breaks out of a deep gorge in the *harra* and runs south, spreading out into a wide *shaib* which provides good grazing and shows signs of having been used for chance agriculture in the recent past. The hills lie on either side of the wadi just to the south of the mudflat. The two sites documented by Rees and Maitland lie on the western side of the wadi, while those with 'burin Neolithic' sites are to the east. Site 2302 is a scatter of chipped stone, mostly concave truncation burins, and a small knapping site. It lies on the edge of the mudflat at the point where the basalt scree begins. Site 2303 is on a hillslope above and a little to the north of Site 2302. It is a slightly more substantial site with a thicker scatter of chipped stone, again with a high proportion of concave truncation burins. Site 2304 lies on the other side of the hill and consists of a small burin scatter in and around ancient corrals. Some of the burins were made on reused Levallois flakes; most of the remainder were made on grey flint heavily patinated to a dark brownish-black colour (Figs 2.21, 2.24).

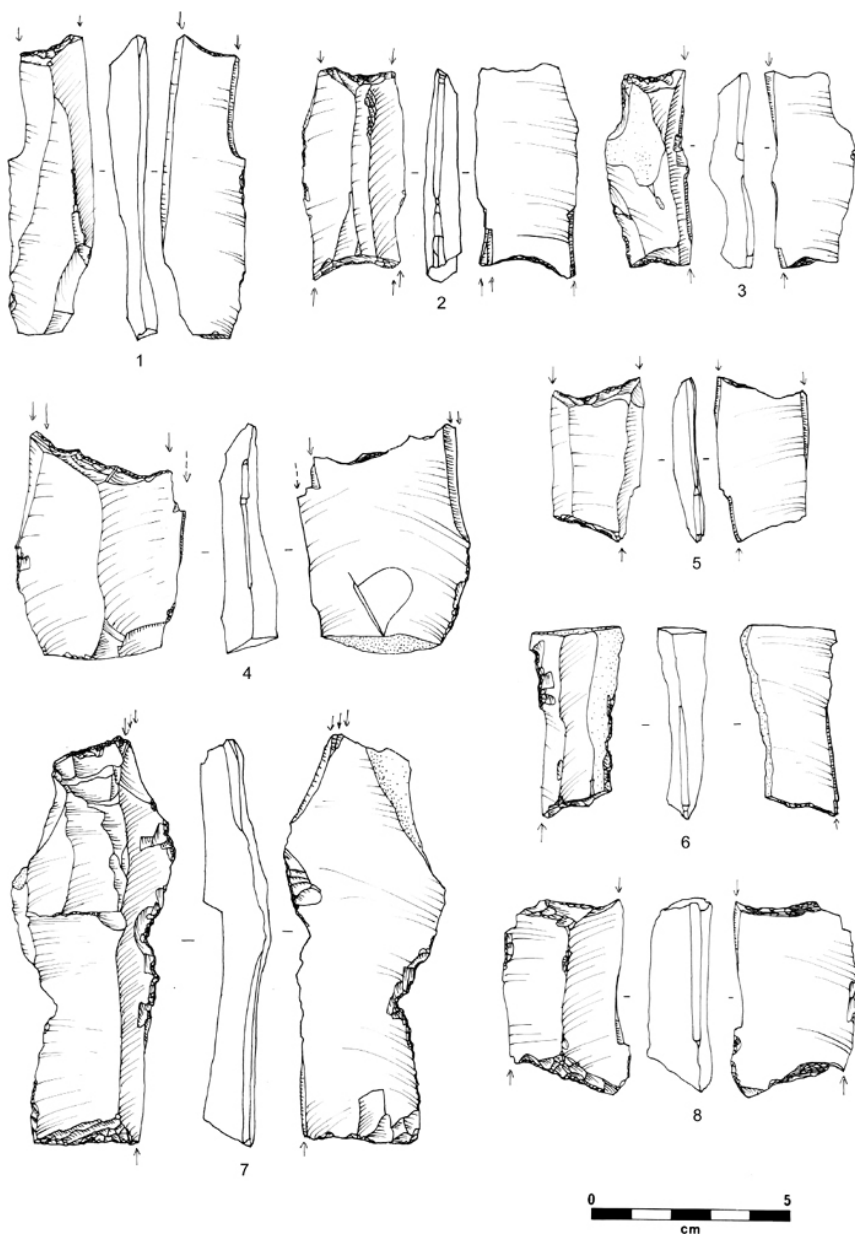


Figure 2.13 Jebel Qurma: chipped stone. 1, 2, 4-7. Concave truncation burin (1601); 3. Concave truncation burin (1618); 8. Concave truncation burin (1615)

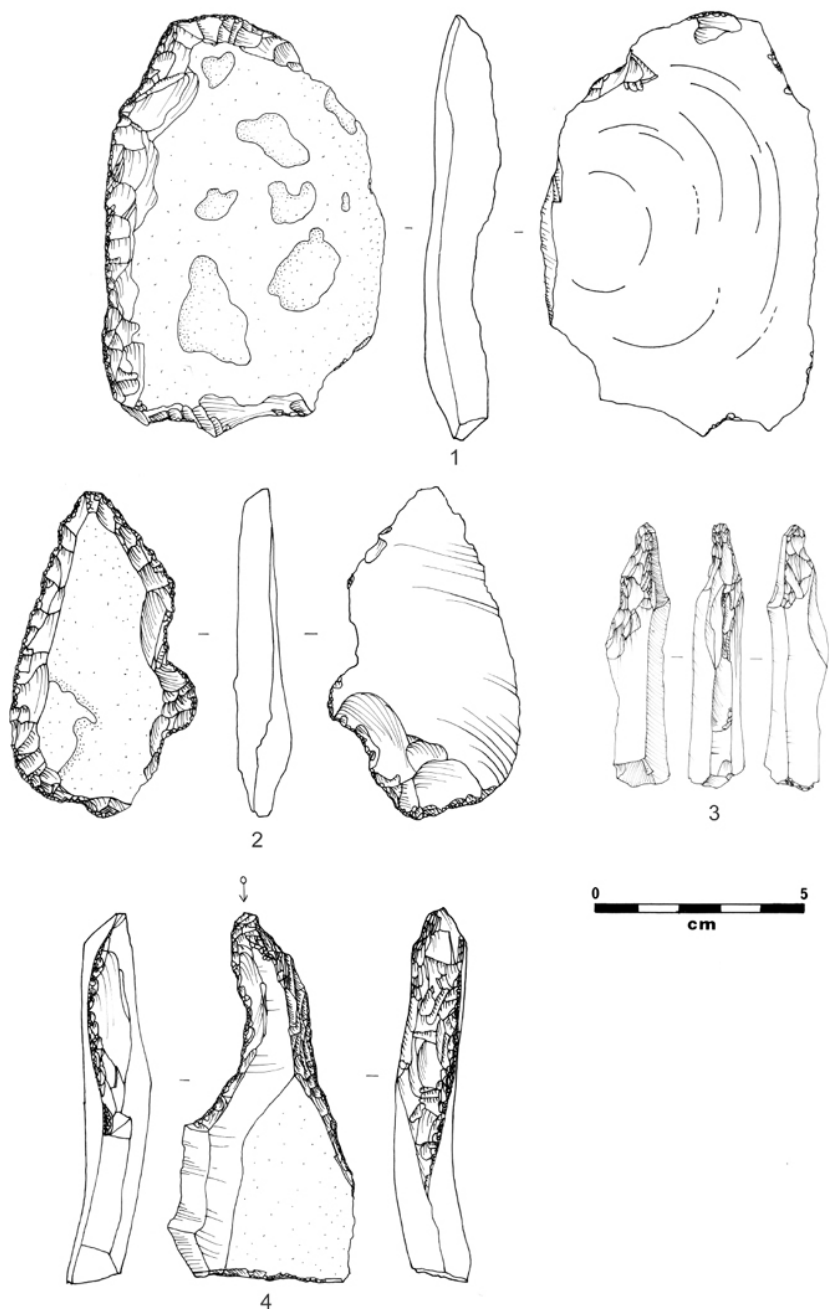


Figure 2.14 Jebel Qurma: chipped stone. 1. Side scraper (1601); 2. Side scraper (1615); 3, 4. Borers (1601)

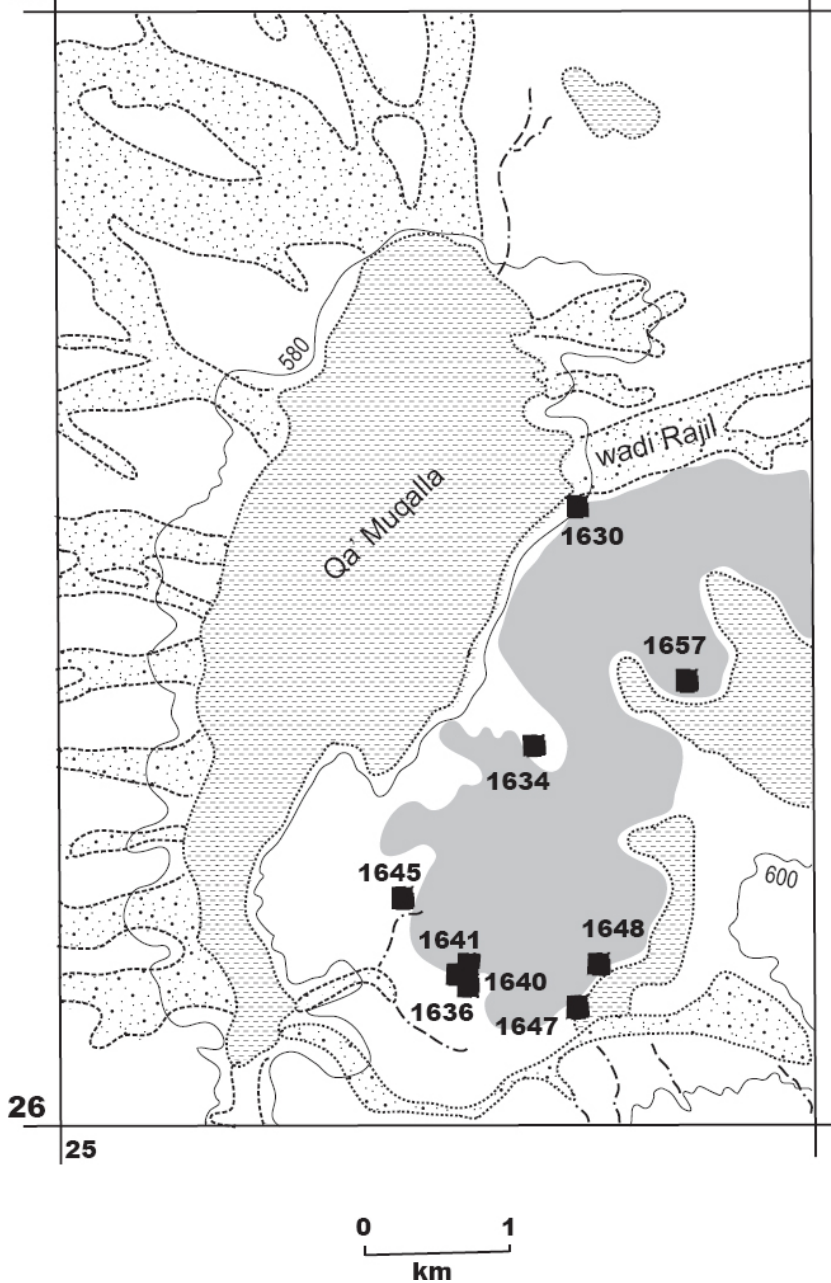


Figure 2.15 Qa' Muqalla: site location map

Qa’ Naja

BDS 2305 map ref. 3453 I 330433; BDS 2308 map ref. 3453 I 337430; BDS 2309 map ref. 3453 I 337449; BDS 2310 map ref. 3453 I 345465; BDS 2313 map ref. 3453 I 340498; BDS 2314 map ref. 3453 I 339508; BDS 2315 map ref. 3453 I 337505

Tool type	1601	1615	1618	1630	1634	1636	1640	1641	1645	1647	1648	1657	2229	2302	2303	2304	2305	2308	2309	2310	2313	2314	2315	2322	2323	2329	2331	2332	2333	2334	2336	
<i>Arrow</i>																																
Nizamin	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	2	1	0
Herziyah	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	
Tinnovse	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	
Broken	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
<i>Burn</i>																																
On break	4	0	0	0	0	1	0	0	0	0	0	2	0	4	5	0	3	4	0	0	4	1	0	0	0	11	15	0	0	5	0	0
On transaction	308	24	35	87	14	77	70	6	39	11	20	56	18	39	133	10	11	319	61	9	35	1	14	17	10	93	192	2	10	22	1	1
Not defined	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
Diamond	1	0	0	1	1	0	0	0	0	0	1	0	0	3	0	2	0	2	3	0	0	1	0	0	1	0	2	3	0	0	1	0
Mixed	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	1	0	0
Broken	0	0	0	2	0	2	0	0	0	0	0	1	2	0	7	0	0	8	0	0	0	0	4	0	0	4	19	1	0	4	0	0
<i>Scraper</i>																																
Flake	11	1	1	3	0	12	0	2	1	2	1	1	0	0	4	0	0	13	1	3	10	4	4	0	0	2	1	0	8	0	0	0
Side	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Domesticated	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
End	4	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	2	0	0	0	0	0	0
Broken	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Biface</i>																																
Foliate	1	0	0	3	0	3	0	1	0	0	0	1	0	0	5	0	0	4	0	0	1	0	0	1	0	1	1	1	0	1	0	0
<i>File knife</i>																																
Tabular	0	0	0	0	0	1	0	1	0	0	0	0	0	0	6	0	1	2	0	0	2	1	1	0	0	2	4	0	0	0	1	0
<i>Bar</i>																																
On blade	7	0	0	1	0	1	2	0	2	1	1	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0
On flake	3	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Drill</i>																																
On spall	0	0	0	0	0	0	0	0	0	0	0	1	5	1	0	0	0	4	0	0	1	0	3	0	0	14	32	0	1	0	0	0
<i>Sickle</i>																																
On blade	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
<i>Fracture</i>																																
Unipolar	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	1	0	1	0	0	0	0	0	0	0	0	0
Bipolar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0
<i>Miscellaneous</i>																																
Blade	5	0	0	3	1	3	1	0	2	0	1	0	1	0	1	0	0	11	0	0	1	0	1	0	1	5	17	2	28	7	0	0
Flake	10	0	0	3	0	0	0	0	0	0	0	0	1	0	2	0	0	2	0	1	2	1	1	0	0	4	3	1	26	4	0	0
Debris	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0

Table 2.14 Survey sites: tool types: absolute counts

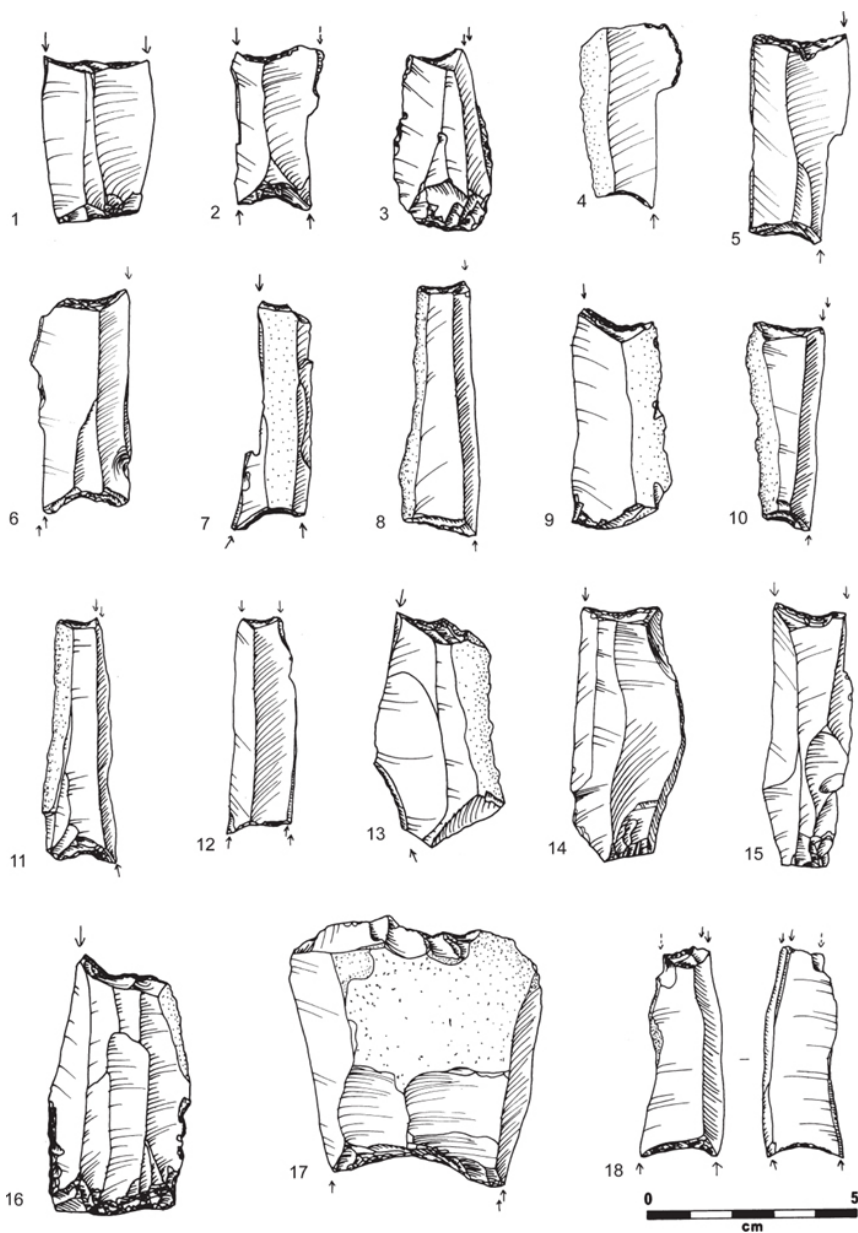


Figure 2.16 Qa' Muqalla: chipped stone. 1, 9. Concave truncation burins (1630); 2, 6, 7, 18. Concave truncation burins (1636); 3, 4. Concave truncation burins (1641); 5, 11. Concave truncation burins (1657); 8, 10, 15. Concave truncation burins (1645); 12. Concave truncation burins (1648); 13. Concave truncation burin (1647); 14, 17. Concave truncation burins (1640); 16. Concave truncation burin (1634)

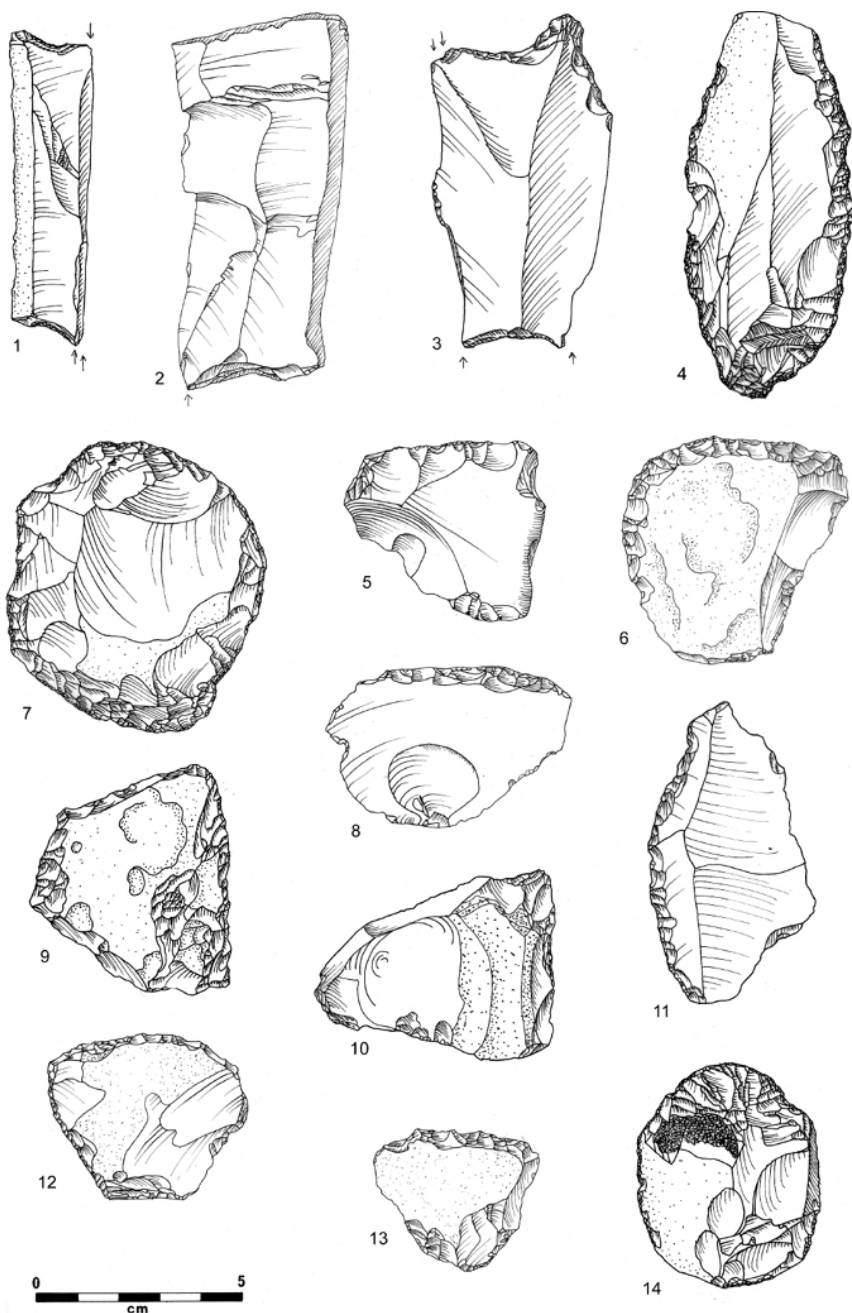


Figure 2.17 Qa' Muqalla: chipped stone. 1. Concave truncation burin (1634); 2. Concave truncation burin (1640); 3. Mixed piece (1657); 4, 7. Scrapers (1630); 5, 6, 8, 9, 11. Scrapers (1636); 10, 13, 14. Scrapers (1641); 12. Scraper (1645)

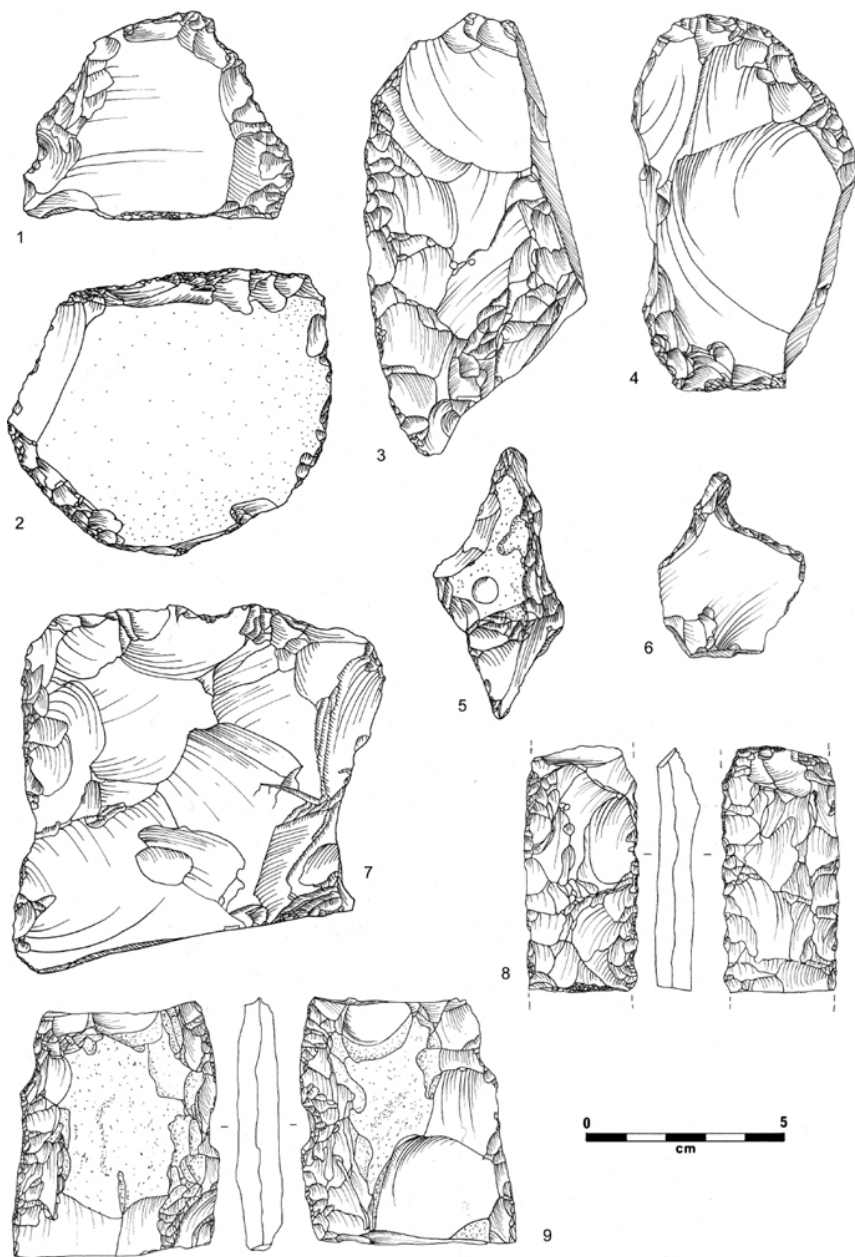


Figure 2.18 Qa' Muqalla: chipped stone. 1, 2, 4, 7. Scrapers (1636); 3. Scraper (1641); 5. Borer (1645); 6. Borer (1648); 8. Biface (1636); 9. Tile knife (1636)

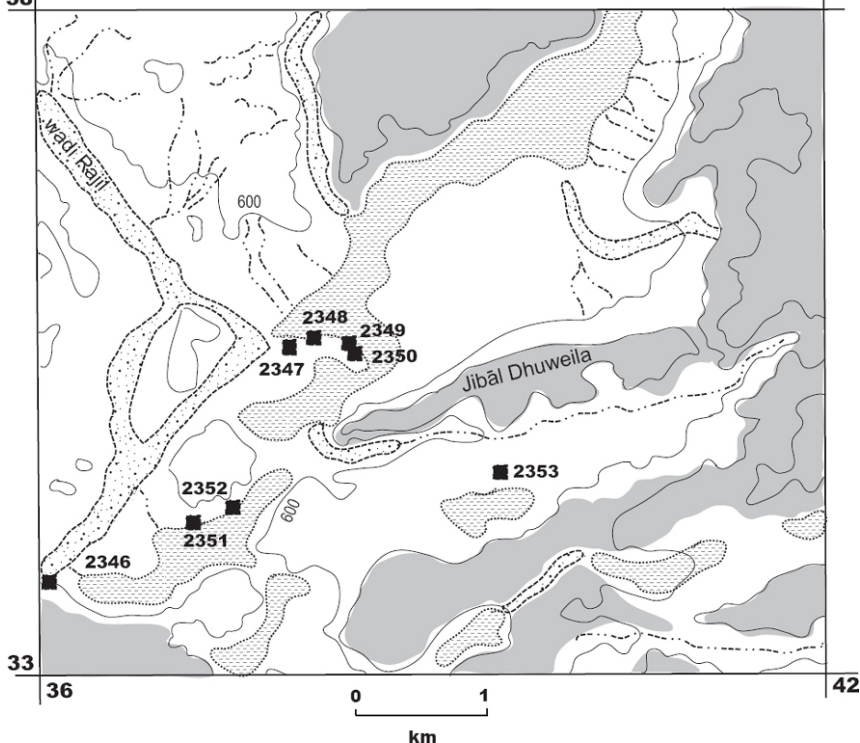


Figure 2.19 Wadi Selahib: site location map

This cluster of sites lies on the northern edge of the Qurma Gap in an area of broken hills at the edge of the main massif of the *harra* (Fig. 2.22). Site 2305 is a small scatter on the promontory of a low hill. Site 2308 is a more substantial site on a low col between two hills. Site 2309 is a large site with corrals, some recently rebuilt. Site 2310 is another small scatter below the main massif.

More sites west of Jebel Naja overlook the extensive qa' of the same name (Fig. 2.23). Site 2313 is a small scatter of chipped stone including truncation burins among corrals just below a basalt peak. Site 2314 is another scatter which also included an Early Bronze Age folded ledge handle and a tabular scraper which might also be Early Bronze Age in date. Site 2315 is a third small scatter of concave truncation burins. The local outcrops in this section of the *harra* edge include a peculiar fine-grained reddish-pink banded chert which was used frequently for the chipped stone assemblages (Figs 2.24, 2.26–2.28).

Wadi Qattafi

BDS 2322 map ref. 3453 I 303556; BDS 2323 map ref. 3453 I 309561

Two sites were found near the mouth of Wadi Qattafi (Fig. 2.25), just north of Site 2321, Jebel Naja. Both are small burin scatters with assemblages similar to that of Jebel Naja itself.

Qa' al-Ghirqa

BDS 2229 map ref. 3454 II 420478; BDS 2329 map ref. 3453 I 412426; BDS 2331 map ref. 3453 I 413421; BDS 2332 map ref. 3453 I 403405; BDS 2333 map ref. 3453 I 413419; BDS 2334 map ref. 3453 I 413415; BDS 2336 map ref. 3453 I 410471

These sites are Late Neolithic in date, but of a very different kind from those previously discussed. Two clusters of settlements have been found, one on a low ridge at the southern end of Qa' Dhuweila, and the second in a similar location a few kilometres to the east on the edge of the large mudflat Qa' al-Ghirqa (Fig. 2.29). Jebel Naja lies only a few kilometres over the *harra* to the south and Dhuweila with its Late Neolithic occupation only a few kilometres to the north, yet each type of site is completely different. The only link between these varied sites lies in the small number of typological parallels in the chipped stone industries.

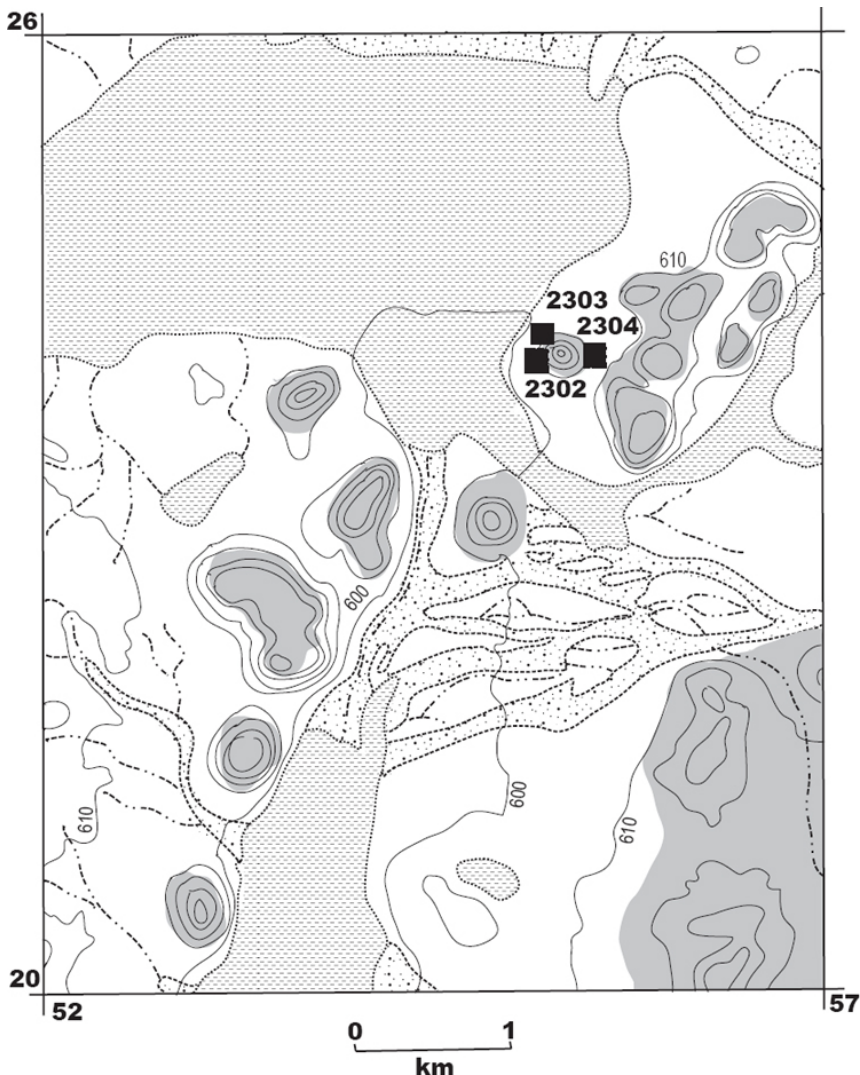


Figure 2.20 Jibal al-Qattafi: site location map

The settlements consist of a number of circular and sub-circular structures, some connected by low enclosing walls (Fig. 2.30). The sites are exposed and are thus heavily deflated, but otherwise seem to have suffered little later disturbance. The stone walls of the structures are still remarkably intact. All structures are visible on the surface, either as free-standing, discrete units whose form is immediately obvious, or as stone piles beneath which distinctive structural features can be seen. Surface collections of artefacts were made at all sites and a detailed survey was made at Site 2329, the most easterly cluster at the southern end of qa' Dhuweila. The site was surveyed in two ways: at the time of discovery in 1982 a rough plan

was made using tapes and compass traverse; this was supplemented in 1986 by a combination of ground survey, some stone clearance and low-level air photography.

Several structural elements can be identified. The most common type is a rounded unit between 5 m and 10 m in diameter, either free-standing or incorporated into enclosing walls. Various smaller, simpler structures consisting of circular and semi-circular features set into and onto bedrock are scattered about between these rounded units. Several units are enclosed by low walls. Other areas, without internal structures, are enclosed in the same way, forming separate corrals. The construction of these units falls into two categories. Enclosing walls and external isolated features are very simple, roughly coursed single-line stone walls; the enclosing walls could have been no more than four or five courses high (*i.e.* c. 0.5–1.0 m). The rounded units are of more elaborate construction. Some consist of purposely chosen upright slabs up to 1.5 m in height set in near-perfect circles, without any signs of roofing or interior supports. Some of these units do not seem to have been completed; others have collapsed. Still other units, perhaps the majority, consist of double lines of masonry up to three or four courses high which are covered with stone slabs in a form of rough corbelling. In many cases, the single entrances have been enhanced by the carrying outward of the double corbelled walls to form narrow passages. The other sites in the area share similar construction techniques, spatial organization and site choice.

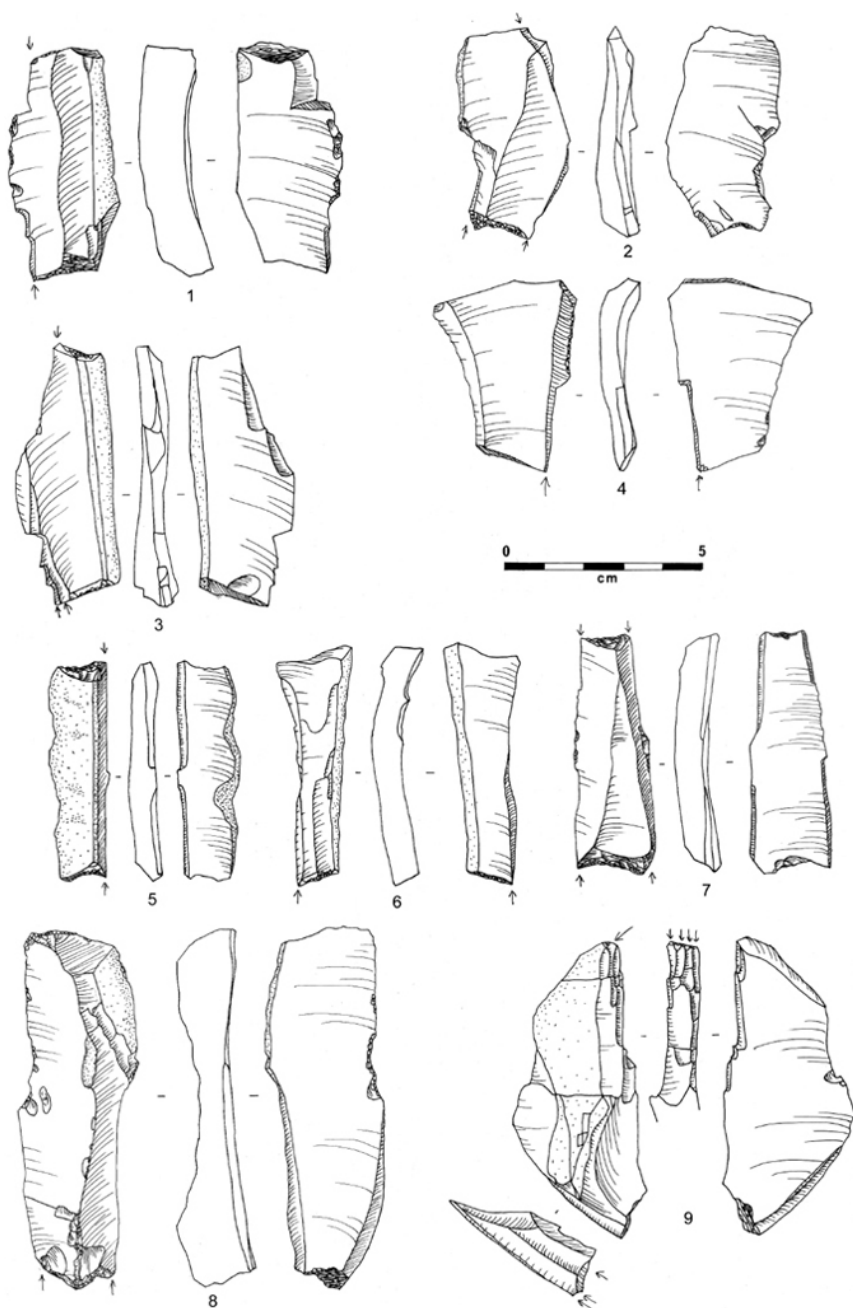


Figure 2.21 Jibal al-Qattafi: chipped stone. 1, 4, 5, 7, 8. Concave truncation burins (2303); 2, 6. Concave truncation burins (2304); 3, 9. Concave truncation burins (2302)

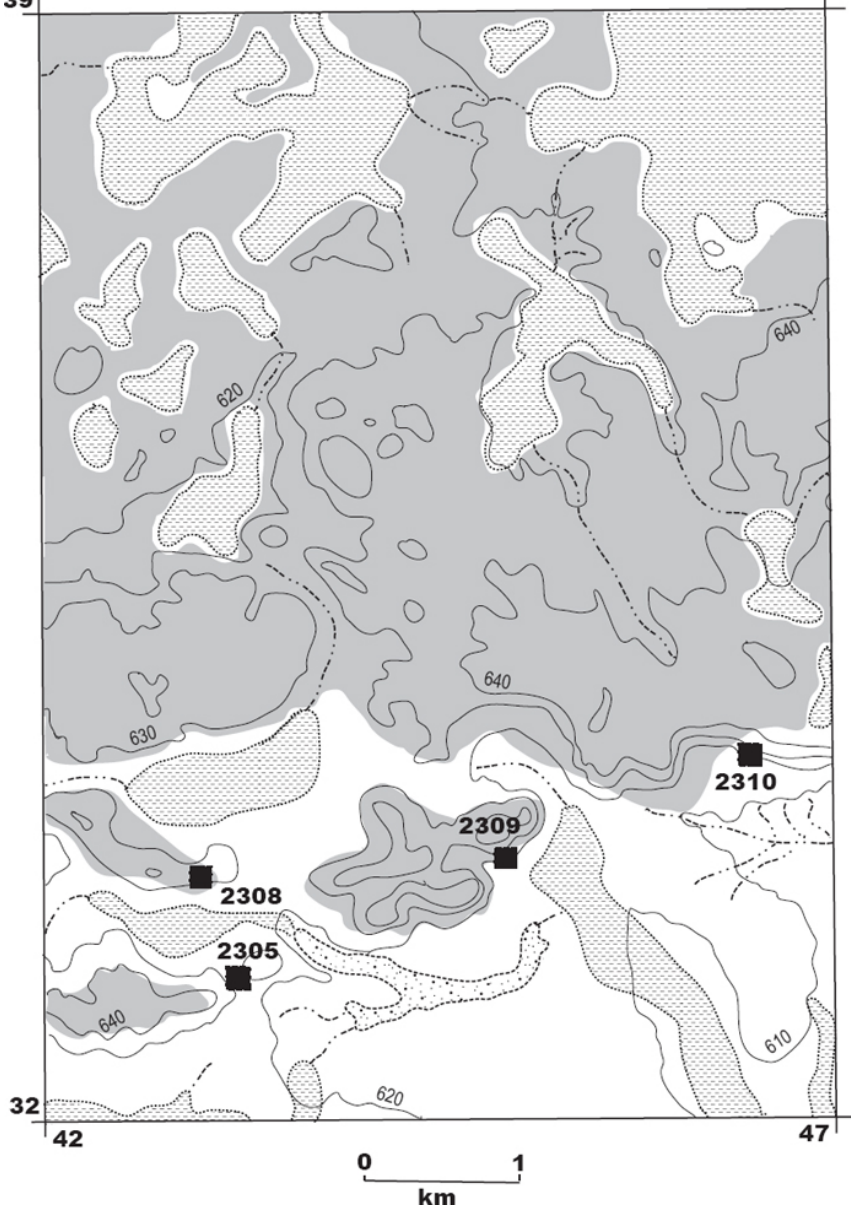


Figure 2.22 Qa' Naja West: site location map

The chipped stone assemblages are generally similar to those of the 'burin Neolithic' sites in terms of typology and tool proportions, but the nature of the tools is very different (Fig. 2.31). The pieces are very small and quite finely worked and there is very little waste material, but the sites are located well within

the *harra* and have no local source of chert, so it is possible that the restrictions on the availability of raw material may account for this. The dominant tool type is, once more, the concave truncation burin. Late Neolithic tanged and transverse arrowheads occur on most sites, but in very low numbers. Bead-making was also carried out at some of these sites. Fragments of pink and green stone, bead blanks and disc-shaped beads were recovered from Site 2331. Fragments of coloured stone were found at other sites.

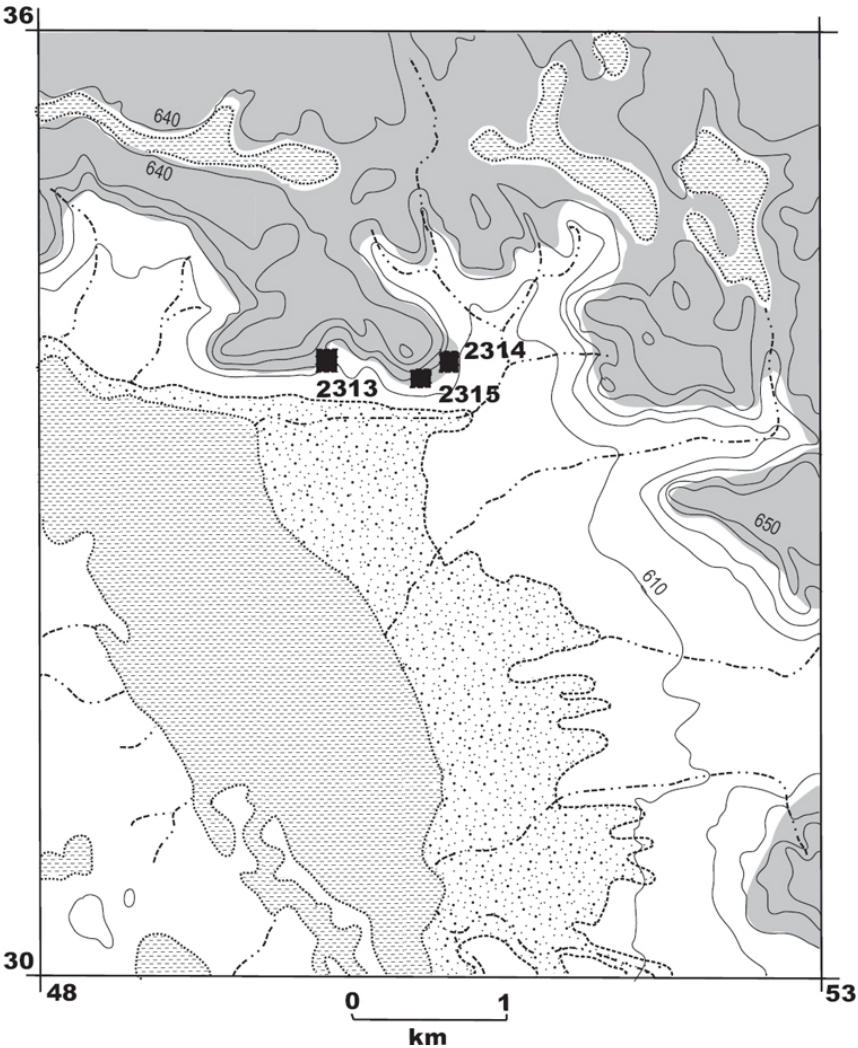


Figure 2.23 Qa' Naja East: site location map

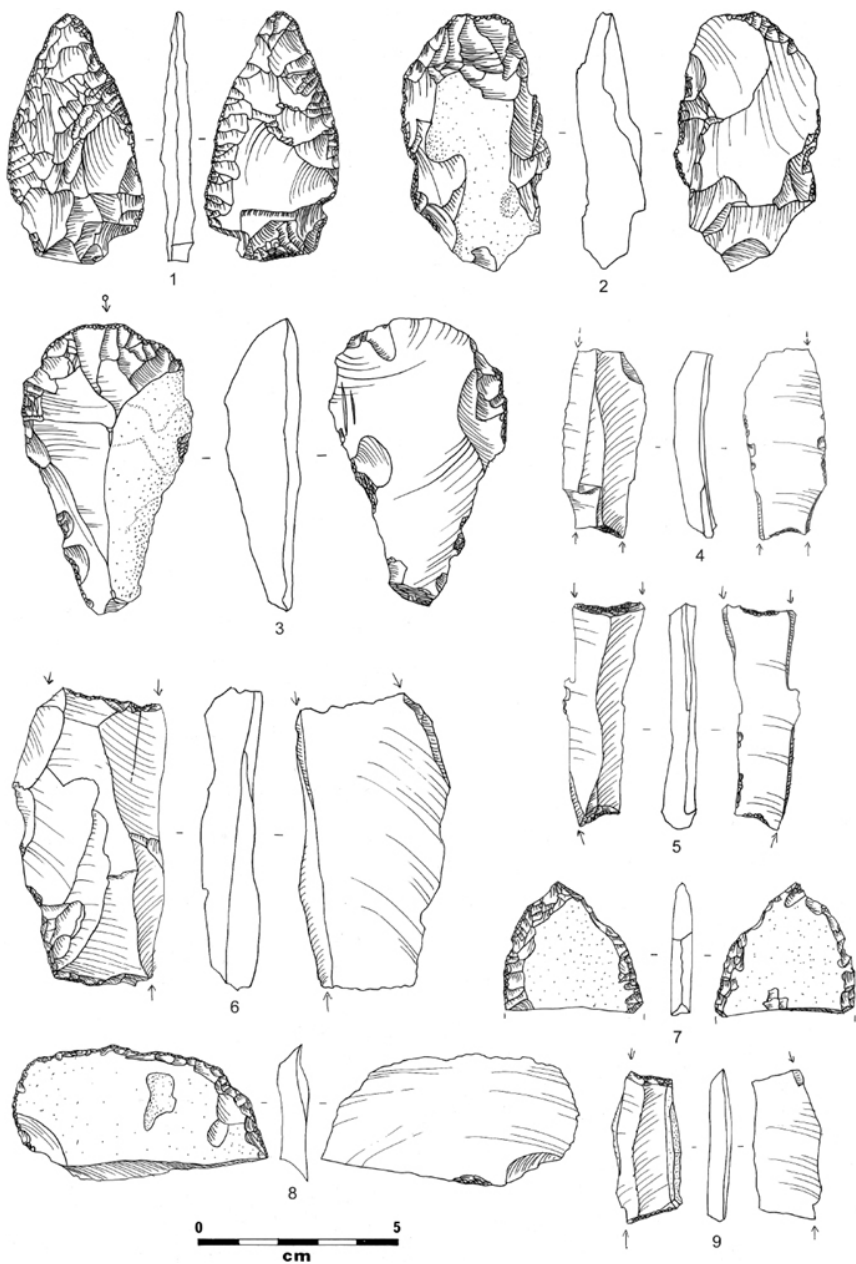


Figure 2.24 Jibal al-Qattafi, Qa' Naja: chipped stone. 1, 2. Bifaces (2303); 3. End scraper (2303); 4, 5. Concave truncation burins (2313); 6. Concave truncation burin (2314); 7. Tabular scraper (2314); 8. Tabular scraper (2313); 9. Concave truncation burin (2315)

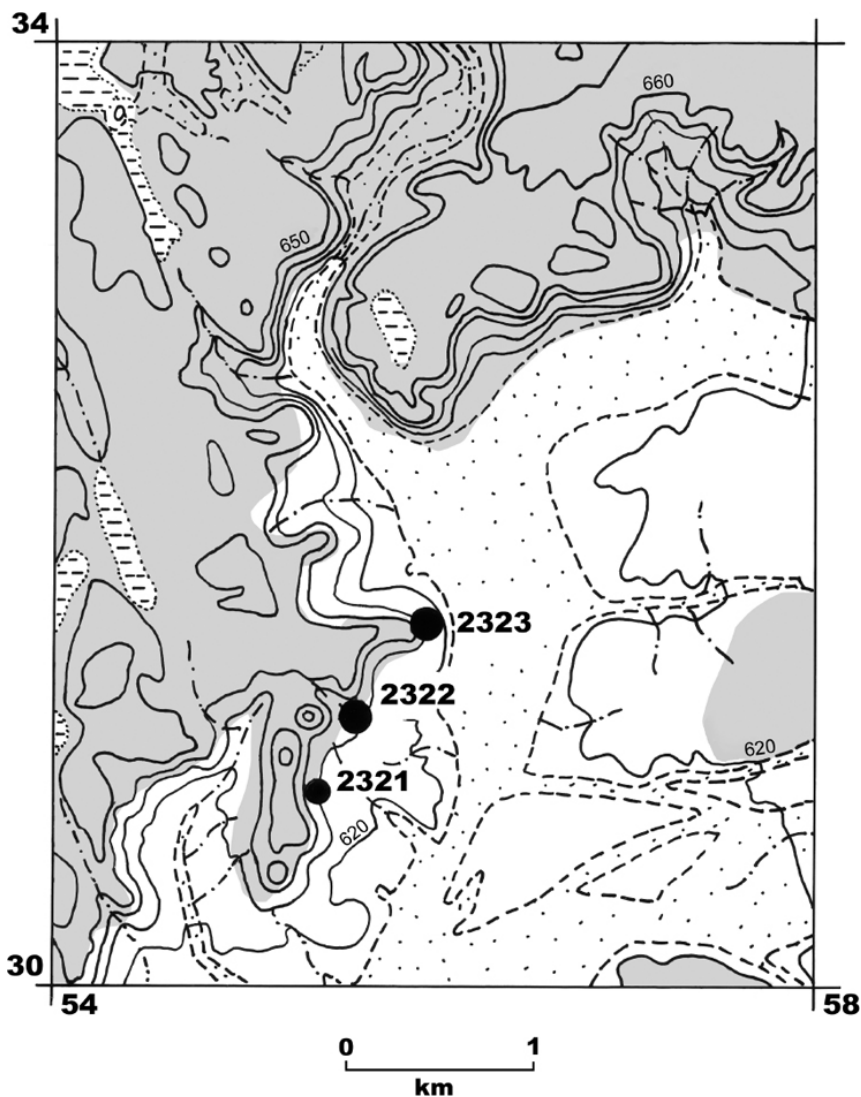


Figure 2.25 Wadi Qattafi: site location map

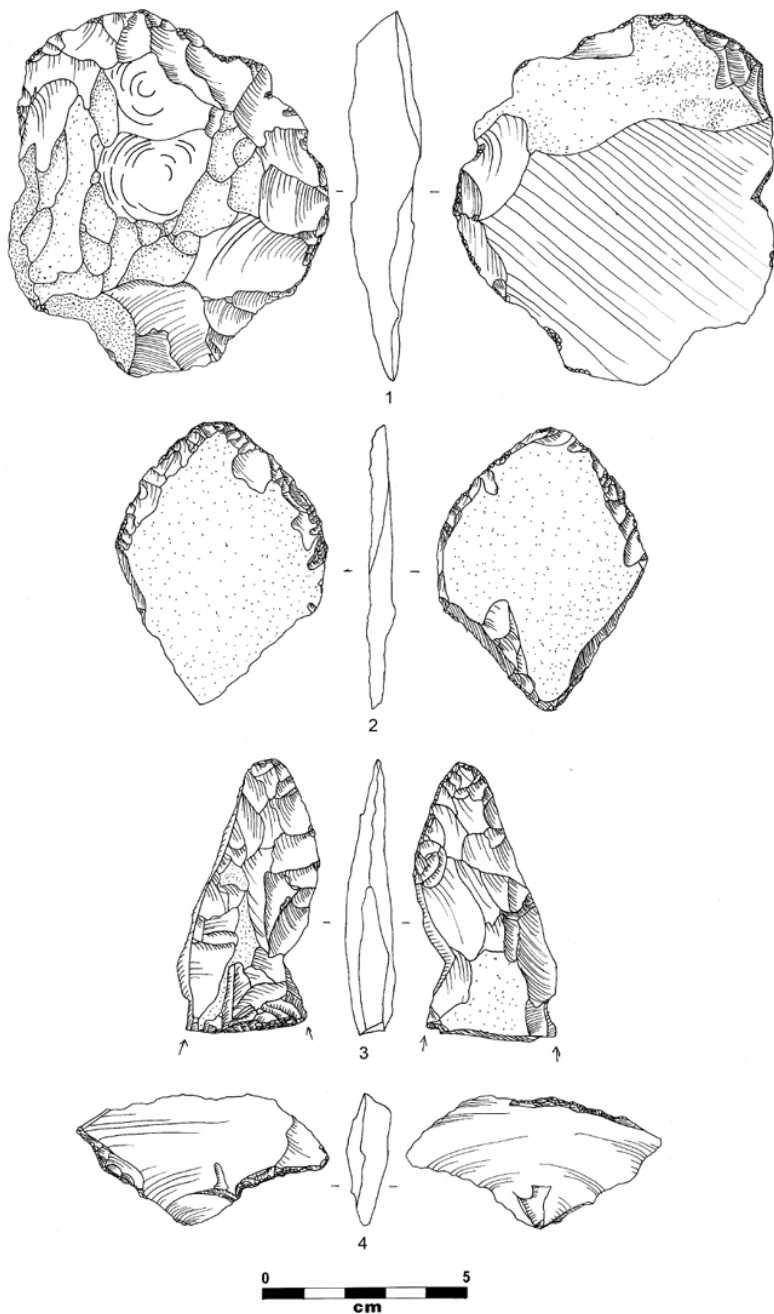


Figure 2.26 Qa' Naja: chipped stone. 1. Scraper (2308); 2. Tabular scraper (2309); 3. Biface (2308); 4. Scraper (2309)

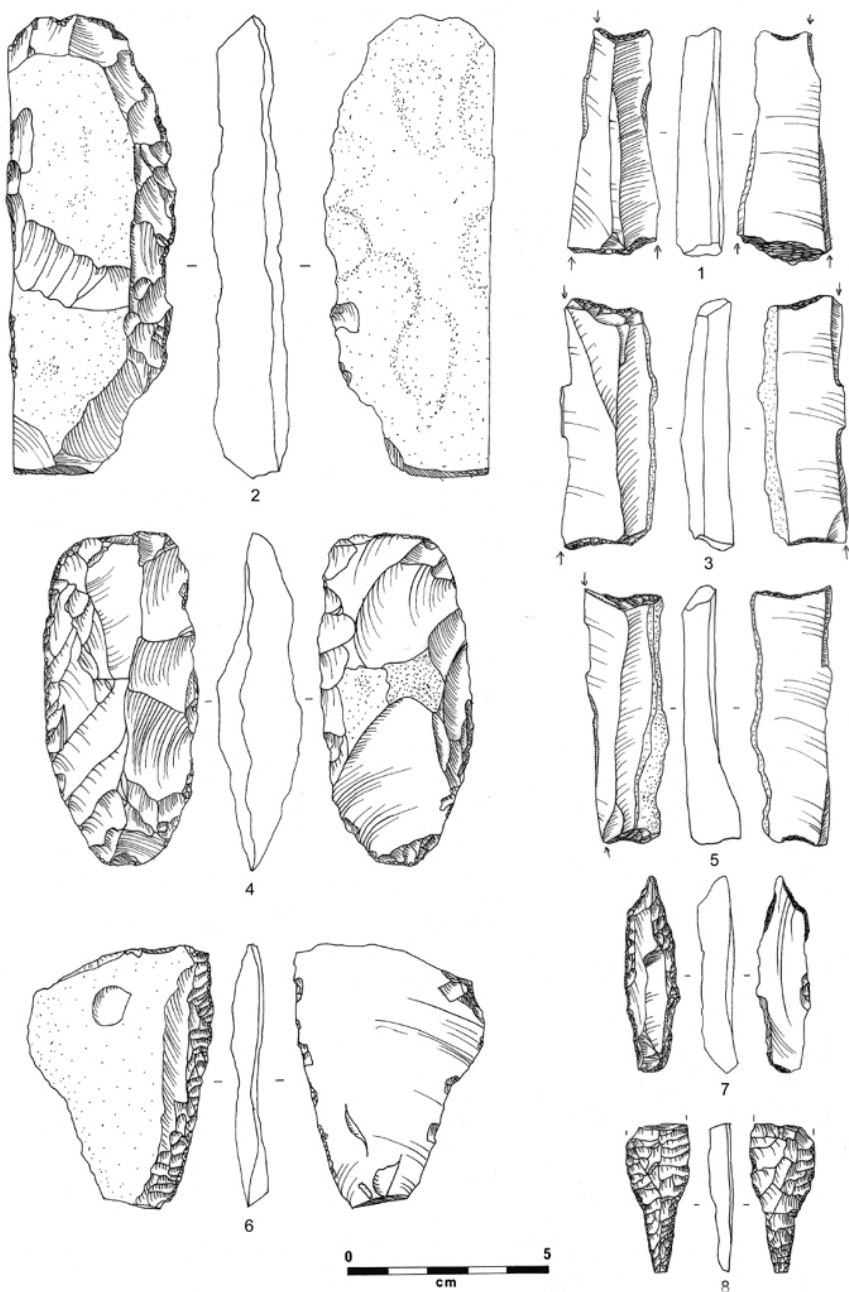


Figure 2.27 Qa' Naja: chipped stone. 1, 5. Concave truncation burins (2308); 2. Scraper (2309); 3. Concave truncation burin (2309); 4. Biface (2308); 6. Scraper (2308); 7. Borer (2309); 8. Herzliyah point (2308)

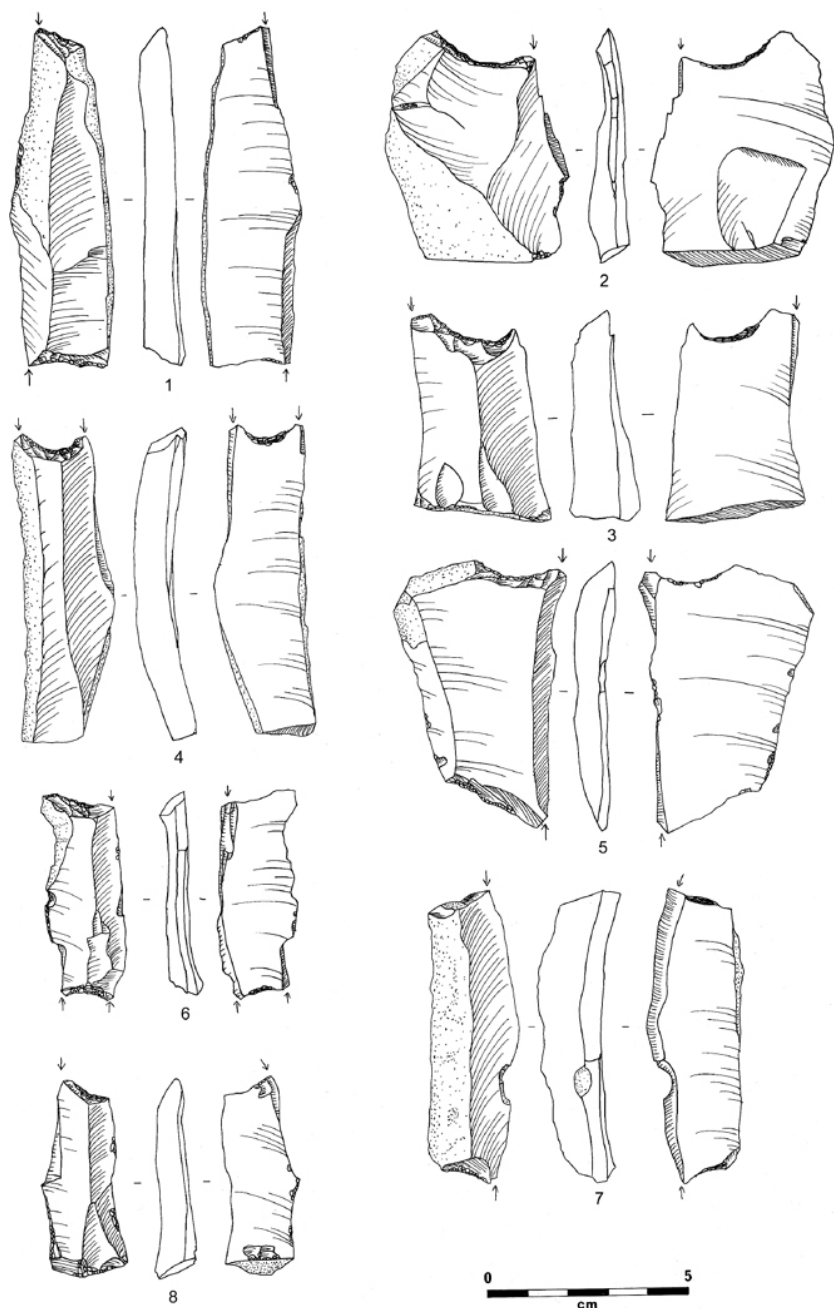


Figure 2.28 Qa' Naja: chipped stone. 1, 3, 5. Concave truncation burins (2308); 2, 8. Concave truncation burins (2305); 4, 6. Concave truncation burins (2309); 7. Concave truncation burin (2310)

339

344

3547

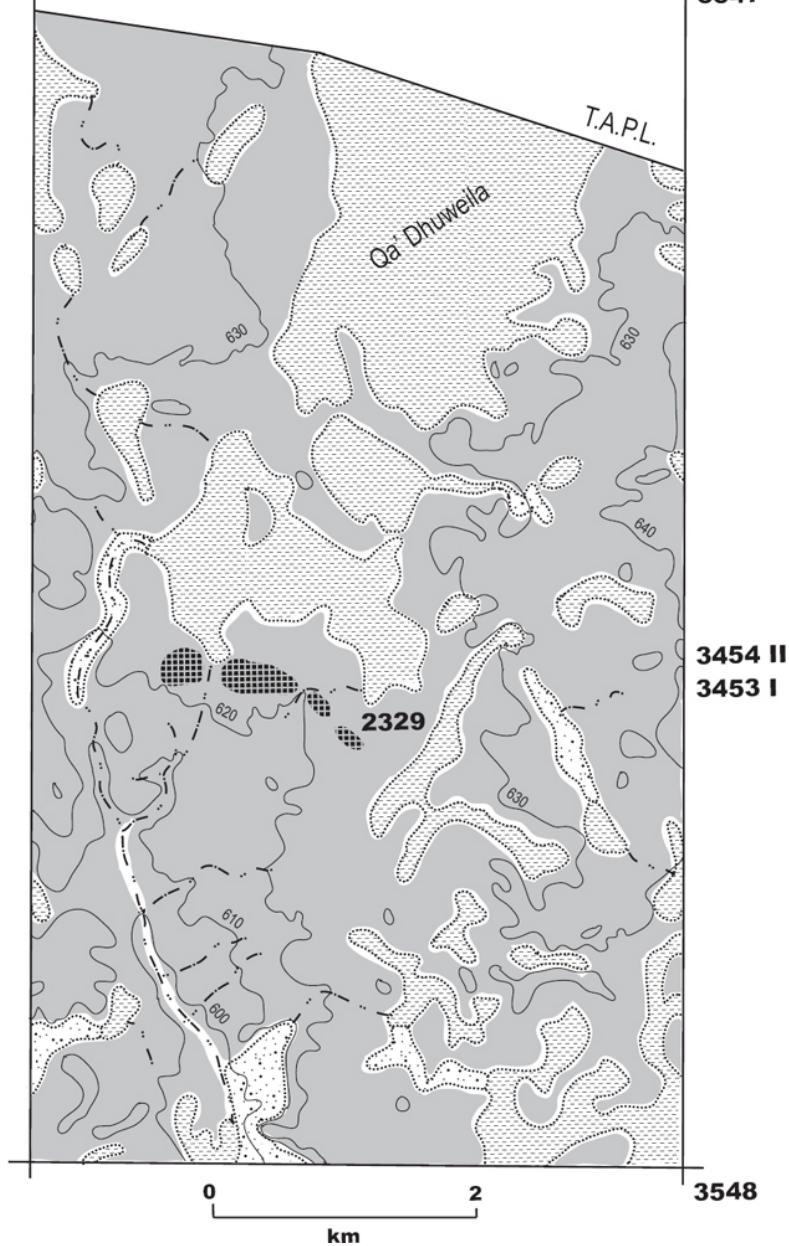


Figure 2.29 Al-Ghirqa: site location map

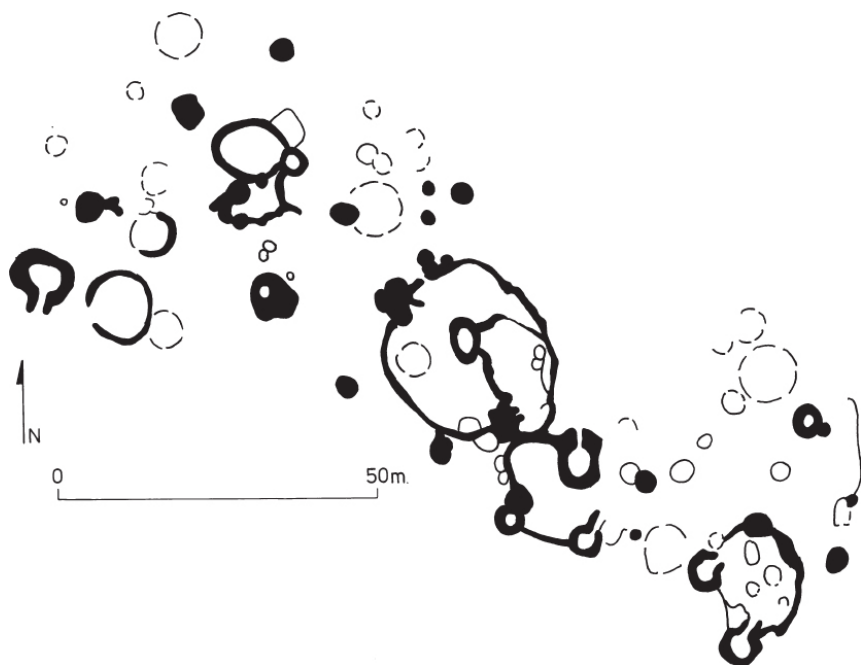


Figure 2.30 Al-Ghirqa: 2329 site plan

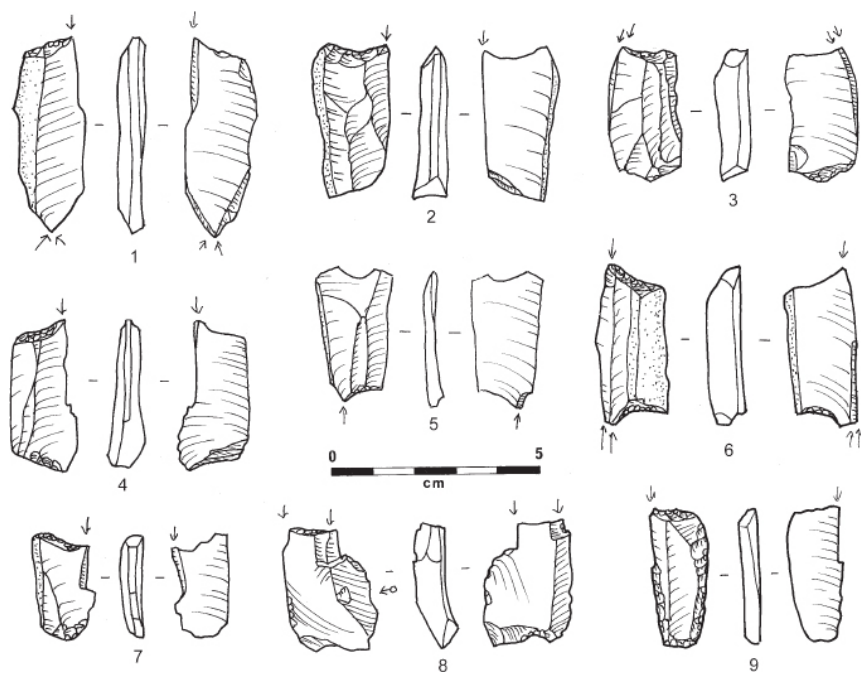


Figure 2.31 Al-Ghirqa: chipped stone. 1, 2. Concave truncation burins (2320); 3–7. Concave truncation burins (2329); 8, 9. Concave truncation burins (3120)

3. Prehistoric Sites at Burqu'

A. Betts, L. Martin, F. Matsuert and C. McCartney

Introduction

Qasr Burqu' is a black box-like fortified tower with outbuildings that overlooks a seasonal lake at the eastern edge of the *harra*. Today the lake stretches over a kilometre in length at its maximum capacity, which is augmented by a modern earth and concrete dam that traps seasonal rainwater (Fig. 3.1). During the period of occupation at the Qasr, sometime between the 4th and the 8th century AD (Helms 1991a, 191), the water in the lake was retained to a lesser extent by a stone dam higher up the wadi, below the Qasr. In earlier times, before the construction of both dams, the bed of the wadi must still have collected substantial quantities of water, as the number of prehistoric sites around the pool clearly attests to its importance.

The wadi which runs past Burqu' is part of the Ruweishdat system, a series of wadis running north-east from Jebel Aneiza towards the Ruhbah depression and the north-eastern flanks of Jebel Druze. East of this system, beyond a low watershed, the wadis of the Wudiyan system drain down towards the Euphrates. The lake is surrounded by a vast ruinfield of camps, graves, corrals and scatters of artefacts of all periods from at least the Middle Palaeolithic up to the present day. Work at Burqu' was carried out over three years from 1988 to 1991, with a break in 1990 as a result of the first Gulf War. Surface survey was carried out around the circumference of the lake and excavations were carried out under the supervision of staff of the Burqu'/Ruweishid Project and students from Edinburgh University at seven prehistoric sites and two sites of uncertain date (Fig. 3.1), most of which fall into the period of the Late Neolithic. Site 03000 was the subject of a Masters dissertation by Matsuert (1989) and Site 27000 was excavated by McCartney (1992). The sites are numbered in a consecutive sequence (Table 3.1) and not according to the 1:50,000 map reference system of the Black Desert Survey. However, the area around the lake at Burqu' is a palimpsest of short-term occupation and it would be impossible to isolate and document all the sites in the

vicinity. The sites described below, therefore, are a representative selection of those large enough or sufficiently distinct to be identified as a defined entity. General surface collections of chipped stone and pottery were also made to document the range of periods of use in the area.

<i>Site no.</i>	
51000	collection, some LN
52000	ation, LN occupation, later burial cairn
53000	ation, LN occupation
54000	ized surface collection, undiagnostic
55000	collection, undiagnostic
56000	basalt mound, surface collection, PPNB
57000	collection
58000	collection, small scatter of flints, Neo?
59000	collection
61000	ation, LN occupation, later cairn
62000	collection, burial complex, inscription (two letters) on block on top of mound, glass bracelet, scatter of LN flints
63000	complex, inscription, probably Safaitic
64000	desert mosque
65000	desert mosque
66000	collection, pre-truck tent site
67000	collection, small burin scatter, LN
68000	ation, Chalco/EB (?) occupation, later cairn
69000	grave
70000	ation, LN occupation
71000	men cemetery
72000	ation, LN occupation
73000	lined pit/grave
74000	lined pits/graves
75000	Safaitic inscriptions
76000	Safaitic inscriptions
77000	Safaitic inscriptions
78000	Safaitic inscriptions
79000	cairn, Safaitic inscriptions
80000	ation, LN occupation
81000	Safaitic inscriptions
82000	Safaitic inscriptions
83000	ck inscription, Safaitic
84000	Safaitic inscription
85000	ed inscriptions, Safaitic
86000	Safaitic inscriptions
87000	Safaitic inscriptions
88000	Safaitic inscriptions
89000	ck inscriptions, Safaitic

Table 3.1 Burqu': site concordance

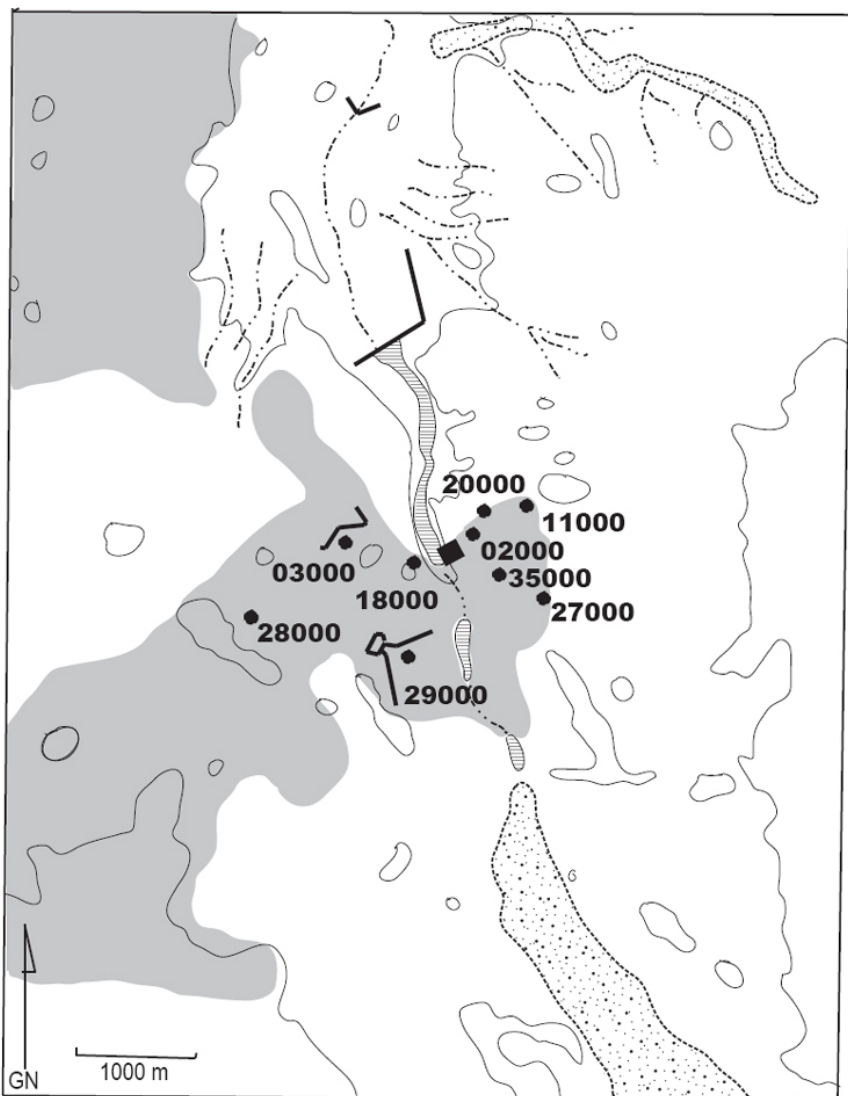


Figure 3.1 Burqu': site location map

The earliest identifiable *in situ* material is Epi-Palaeolithic in date (Betts *et al.* 1998, 11 ff.). No material from the PPNA has been identified and the PPNB is poorly represented, but there are a significant number of sites dated to the Late Neolithic. Evidence for later periods is hard to identify, possibly owing to a lack of diagnostic material for post-Neolithic sites in the region. The next period of use which can be clearly identified is the time from roughly the 1st century BC to the 4th century AD, the period of Safaitic inscriptions, which are associated with several of the numerous mounds and cairns around the lake (Oxtoby 1968;

Winnett and Harding 1978). Sherd scatters indicate continued use in the Islamic period. The first structures in the Qasr complex may have been established by around the 4th century AD, while the 'Walid' inscription over one of the interior doorways provides proof of occupation into at least the 8th century (Helms 1990; 1991). Thereafter the material record provides only sporadic dating, primarily in the form of a very small number of glazed sherd fragments, but it is likely that, as such an important water source, the lake was visited continuously up until the present day.

Site 03000

Site 03000 is located on a slope on the west side of the lake at Burqu' above a small wadi which runs down into the lake, and lies among a concentration of sites of differing dates. The position overlooks the lake, giving clear views over a wide area. Before excavation the site consisted of a low mound of tumbled rocks, but wall lines were visible on the surface and there were no obvious signs of recent use or structural alterations. The surface of the site and the surrounding area were covered with a scatter of fragmented bone and chipped stone which included retouched pieces diagnostic of the Late Neolithic period. A complete collection of surface material was made in and around the site. Trench 100, which was 10 m × 4.75 m, was laid out across roughly half of the mound (Fig. 3.2), its location being chosen in order to allow investigation of the visible structural features. The deposits were then excavated to bedrock but the walls were not removed (Fig. 3.3); all excavated deposits were sieved through 1-mm mesh. Four phases of use and reconstruction were identified. The structural features consisted of a series of outer walls of apparently differing construction dates, and thinner partition walls, again apparently of differing construction dates, which divided the interior into a number of small irregular units. Construction techniques included a combination of solid drystone walling, single rows of upright slabs supported by rubble packing on one side and, more rarely, double rows of orthostats with rubble packing between them (Fig. 3.4).

The uppermost levels of the site consisted of loose windblown sand with small chunks of weathered basalt. Below this was a hard compacted layer of sandy deposits with a quantity of tumble and rubble collapse. Below this lay the main occupation deposits, which were dark greyish-fawn in colour with little rubble. Successive layers of beetle (*Polyphylla fullo*) casts 20–30 mm in depth were found throughout and there was a marked concentration of artefacts in the upper levels consistent with surface deflation following abandonment of the site. Occupation deposits were greatest towards the centre of the site.

Dating

Only one radiocarbon date (6900 ± 100 BP (OxA-2808 5890–5590 cal. BC)) was obtained from the site. The sample was charcoal obtained from F11 (03158), a pit cut from the top levels of Phase 3 and filled with rubble in an ashy matrix. The sample dates the later occupation at the site.

Stratigraphy

Phase 1a

The earliest construction feature, Wall I, was built on bedrock, with a slight hollow scooped out for the foundations. It forms an approximate semi-circle in plan and was built from a single line of large blocks supported at the base by rubble packing. Its original morphology was lost in later reconstruction (Wall VII). A series of hearths and pits was cut into bedrock (F1, F2, F3/4, F5, F6, F7, F10, F12, F13, F16, F17).

Phase 1b

Phase 1b represents an accumulation of occupation deposit overlying several of the earlier hearths and pits. Walls II, III, IV and VIII were built in this phase, creating Unit 4. They overlie occupation deposits of Phase 1a and are of different construction from Wall I. They are solidly built of drystone rubble, are roughly a metre in width and still stand several courses high; in plan, they curve only slightly. The deposits contained chipped stone, bone and evidence of bead manufacture, including green and white stone beads and fragments of Dabba marble. The beads and manufacturing waste were especially concentrated in Unit 2, to the west of Wall II.

Phase 2a

Walls V, VI and VII were built during this phase. They form Unit 3 and fully define Unit 2 and Area 1, creating for the first time a full structural complex subdivided into a number of small cellular units. There is a fairly substantial depth of occupation debris belonging to all phases within these cells. During the excavations it was noted that beetle casts of *Polyphylla fullo* were superimposed in a long succession, suggesting that the surfaces were used intermittently and then temporarily abandoned. Occupation deposits associated with this phase were found throughout the internal areas. Construction of the walls varies in technique: Walls V, VI and VII were built of large orthostats wedged upright and supported by rubble packing at the base, placed mostly on the outer sides of the wall; in some places a shallow foundation cut could be identified. In contrast, the earlier Wall VIII was built using four courses of small stones topped by small to medium-sized rocks.

Phase 2b

This phase comprises some rebuilding of the earlier constructions. Some small extension walls were built and the entrance linking Units 1 and 3 was blocked, either deliberately or by natural collapse which was never removed.

Phase 3

This phase comprises the ancient compacted surface of the occupation levels with deflated layers of artefacts. The only feature is F11, a pit cut down into the main occupation levels below.

Phase 4

This is the last phase of use at the site and consists of a pit (F8) cut through the

compacted deposits of earlier phases and tumble from the collapse of the earlier structures.

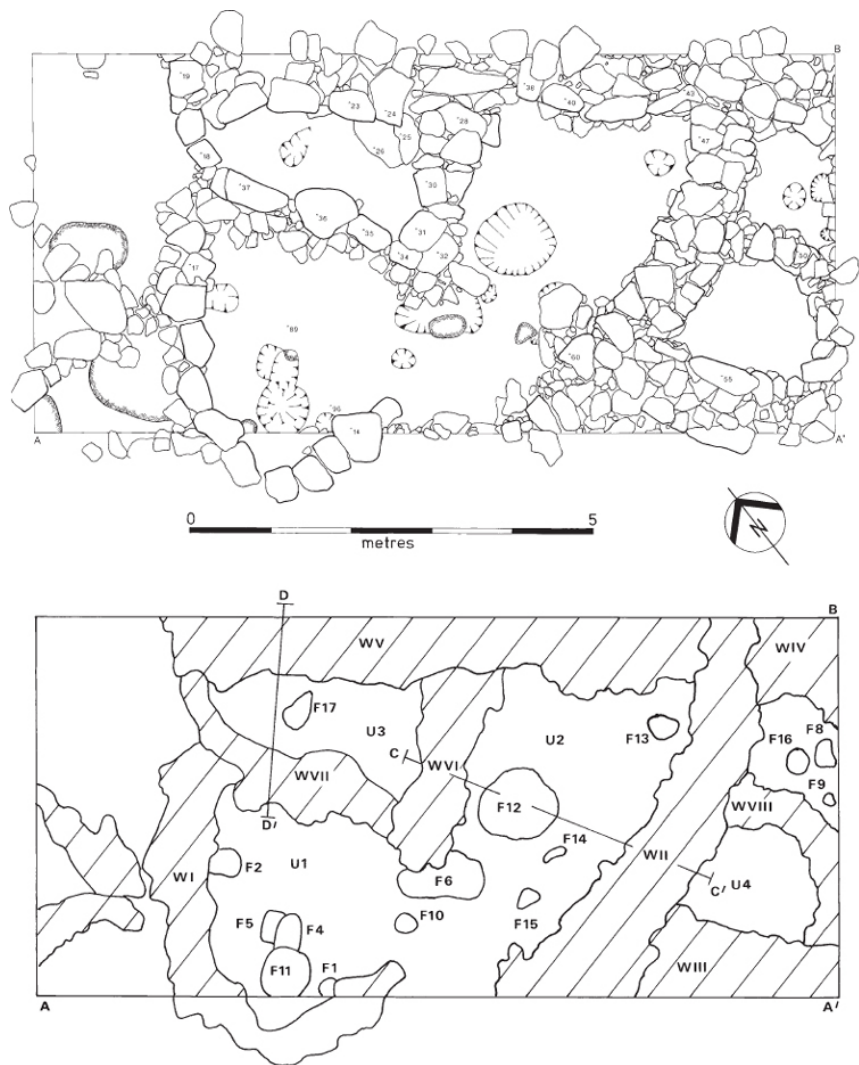


Figure 3.2 Burqu' 03000: general site plan

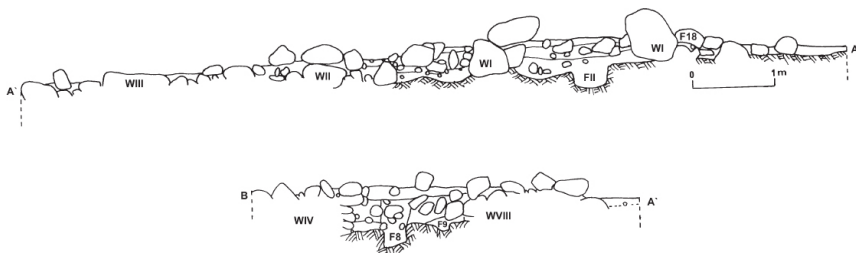


Figure 3.3 Burqu' 03000: sections

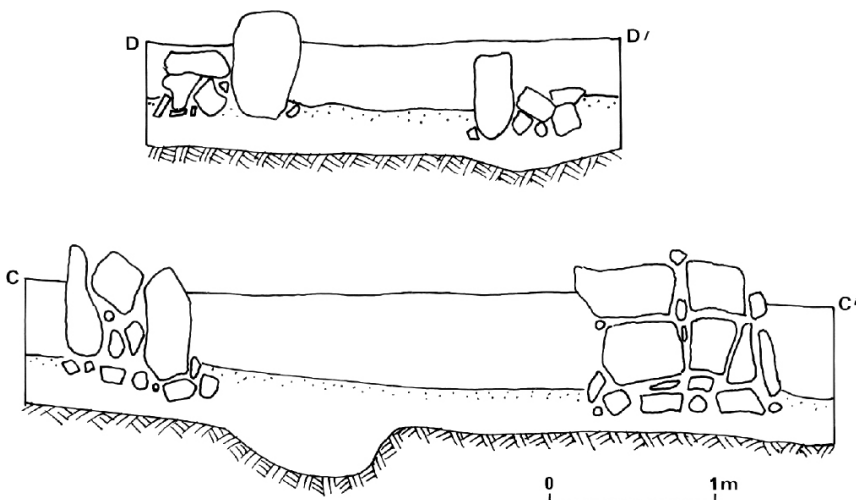


Figure 3.4 Burqu' 03000: schematic sections showing construction techniques

Phase 5

This comprises the windblown deposits forming the topsoil.

Unit 1

Depth of deposition: 0.26–0.40 m

Approximate area: 6.50 sq m

The unit is defined by Walls I (Phase 1a) and VII (Phase 2a). The occupation deposits within the walls belong to Phase 2a and overlie the pits of the earliest phase. Bedrock slopes towards the south and the deposits are thicker here than higher up the slope. The deposits were rich in chipped stone and faunal remains. Two basalt rubbers and a stone ring fragment were found inside the cell and a second stone ring fragment was recovered from the windblown deposits around the rubble packing on the outer side of Wall I in the extramural Area 3.

Unit 2

Depth of deposition: 0.75 m

Approximate area: 5.04 sq m

The cell is roughly rectangular in shape and bounded by Walls II (Phase 1b), V (Phase 2a), VI (Phase 2a) and two small cross-walls (F20 and F21) dated to Phase 2b. In the lowest levels beads and fragments of Dabba marble were found, while several more stone beads, stone fragments, bead blanks and a shell bead, as well as a basalt rubber and a broken stone ring, were recovered from the upper layers. The concentration of beads and raw material in Unit 2 suggests that it was used as a manufacturing area. Drills on burin spalls were also found in the deposits.

Unit 3

Depth of deposition: 0.30 m

Approximate area: 1.71 sq m

The three walls which define this unit (V, VI and VII) all belong to Phase 2a. Its entrance was from Unit 1, but was blocked in Phase 2b. The internal face of this unit is free from rubble packing, with the exception of a few small stones placed between the orthostats, and the surface slopes slightly. The upper levels were filled with rubble and collapsed blocks and there were few finds in the fill. A red stone bead was found near the base of the occupation deposits.

Unit 4

Depth of deposition: 0.27 m

Approximate area: 1.53 sq m

The unit is defined by Walls VIII, II and III (Phase 1b). The cell forms a rough arc with a straight face against Wall II. A fragment of a stone ring was found in the upper layers of the occupation deposit.

Area 1

Depth of deposition: 0.34 m

Area 1 lies between Units 1 and 2 and is delimited by F20 and F21 (Phase 2b), Walls VI (Phase 2a), I (Phase 1a) and II (Phase 1b). The occupation deposits contained two basalt querns and a basalt rubber, a pink stone bead and a complete stone ring. The single obsidian blade fragment also came from here. The levels of Phase 2 overlay F6, a large pit underlying Wall VI, which contained a red stone bead in the fill.

Area 2

Depth of deposition: 0.12 m

Area 2 is enclosed by Walls II, IV and VIII (Phase 1b). There was little evidence for occupation, and it seems likely that the area was external to the structures and saw limited human use in the later phases. Two pits (F16 and F9) were cut into bedrock. The only feature of Phase 4, pit F8, is cut through compacted deposits into bedrock.

Area 3

Area 3, west of Wall I, is an external area with no obvious depth of occupation deposit. A fragment of stone ring was found in the rubble packing of Wall 1, and

was therefore associated with Phase 1a.

Phasing

+ + Unstratified surface collections

5. Topsoil, windblown sand and small rocks

4. Pit F8, loose rubble from collapse of earlier structures

3. Compacted surface of occupation with some ancient deflated layers

2. Main period of occupation and construction

1. Pits and hearths cut into bedrock, early walls

For contexts by phase, see Table 3.2.

Special finds

Several fragments of limestone rings were found, together with one complete example (Fig. 3.5; Table 3.3). Similar rings are known from Neolithic sites including, in Jordan, Ba'ja, Basta and 'Ain Ghazal (Starck 1988; Rollefson and Simmons 1988, 417), Azraq Oasis and Wadi Jilat (Baird *et al.* 1992, 24), and Dhuweila (Betts *et al.* 1998, 136). At 'Ain Ghazal stone rings were found in levels of all periods (PPNB, PPNC and PNA) at the site; at Ba'ja and Basta, they occur in the final PPNB; and at Azraq, Wadi Jilat and Dhuweila in Late Neolithic contexts. Such rings have occasionally been believed to be bracelet fragments, but Starck suggests that the wide variation in diameters makes this improbable and suggests that they may have been clasp-like ornaments or pendants. The small diameter of the complete example from 03000 supports this hypothesis.

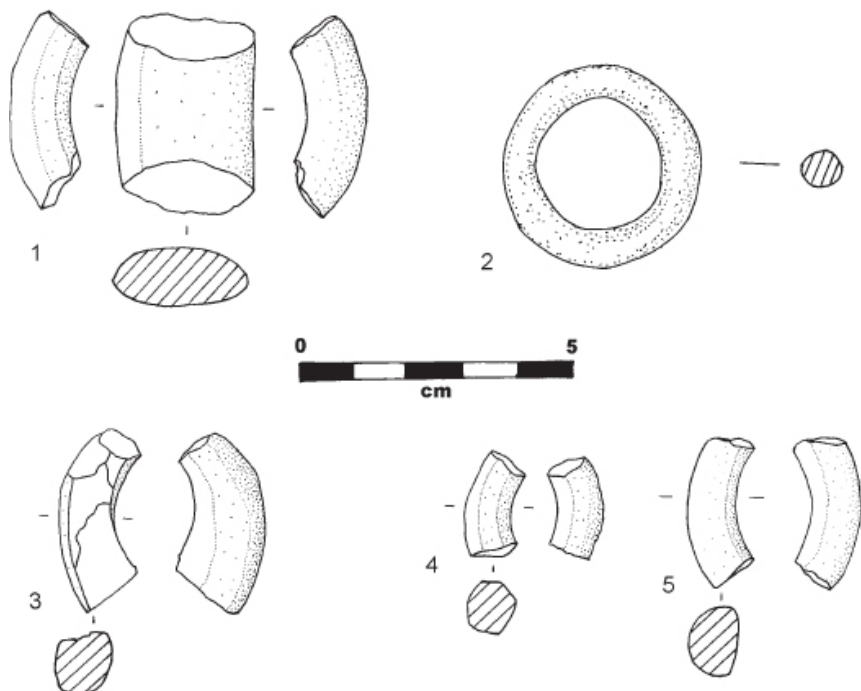


Figure 3.5 Burqu' 03000: special finds. Stone ring fragments. 1. 107/1; 2. 138/1; 3. 133/3; 4. 134/2; 5. 124/3

PHASE ++
100 Loose sand, rocks and windblown deposits, surface
PHASE 5
100 Rubble and compacted windblown sand
PHASE 4
100 Upper fill of unit 3, basalt rubble and sand
100 Stones around upper edge of pits F4, F5, F11
100 Upper collapse from wall II
100 Upper fill of unit 2, smaller stones and compact sandy matrix
100 Small stone feature at east end of unit 1
100 Basalt rubble at east end of unit 1
100 Basalt rubble in unit 4
100 Upper rubble collapse of wall VII
100 Upper rubble collapse of wall III
100 Rubble from small walls west of wall I
100 150
PHASE 3
100 Upper collapse at western end of wall V
100 Upper rubble collapse of wall VI
100 Below 105, sandy windblown and water-laid deposits
100 Below 110, sandy windblown and water-laid deposits
100 Below 116, similar fill
100 Below 115, similar fill

~~U20~~ Upper rubble collapse of wall IV
~~B20~~ Bw 117, similar fill
~~U21~~ Upper fill between walls IV and VIII, sandy windblown and water-laid deposits
~~B20~~ Bw 120, similar fill
~~B24~~ Bw 108, sandy windblown and water laid deposits
~~B26~~ Bw 118, similar fill
~~B27~~ Bw 123, basalt collapse
~~B29~~ Bw 112, basalt rubble and sandy fill
~~L30~~ Lower fill of unit 1
~~B31~~ Bw 113, sandy windblown and water laid deposits
~~B33~~ Bw 131, basalt rubble and sandy fill
~~F38~~ of pit Fll
~~F79~~ of pit Fll
~~F80~~ of pit Fll

PHASE 2

~~V21~~ VII
~~V21~~ VIII
~~O28~~ Occupation levels in unit 2
~~O32~~ Occupation levels in unit 1
~~O34~~ Occupation levels in area 1
~~O35~~ Occupation levels in unit 4
~~O36~~ Occupation levels in unit 3
~~O37~~ Occupation levels in unit 1
~~O39~~ Occupation levels in unit 1
~~O41~~ Occupation levels in unit 1
~~O43~~ Occupation levels in area 2
~~O55~~ Occupation levels in unit 3
~~R59~~ Rubble clearance in unit 3
~~V61~~ V, western end
~~V61~~ V, centre
~~V61~~ v, centre
~~V61~~ V, centre
~~V61~~ V, eastern end

PHASE 1

~~V61~~ I
~~V05~~ Western buttress of wall 1
~~B33~~ Bw 134, occupation levels in area 1
~~B40~~ Bw 138, occupation levels
~~B42~~ Bw 140, occupation levels
~~A44~~ 42
~~B45~~ Bw 141, occupation levels in unit 1
~~B46~~ Bw 143, occupation levels in area 2
~~A47~~ 46
~~O48~~ Occupation levels in unit 2
~~A49~~ 45
~~A52~~ 35, occupation deposits in unit 4
~~B53~~ Bw 152, occupation deposits
~~B54~~ Bw 149, occupation deposits in unit 1
~~H56~~ Earth F4
~~B57~~ Bw 154, ashy levels in unit 1
~~B60~~ Bw 136, occupation levels in unit 3
~~V61~~ VII
~~A62~~ 61
~~B63~~ Bw 160, occupation levels above bedrock

B6Dw 157, occupation levels above bedrock
 H20rth F5
 H21rth F1
 H22rth F2
 H23rth F6
 H24rth F7
 H25rth F8
 H26rth F9
 H27rth F10
 B2Bw 168, wall V
 P81F12
 P82F13
 P83F14
 P84F15
 B8Bw 165, wall V
 B8Bw 166, wall V
 B8Bw 168, wall V
 A8B87
 P89F16
 P90F17

Table 3.2 Burqu' 03000: contexts by phases

<i>Description</i>
S0 ne ring fragment, pale cream, limestone
B38 alt bifacial loaf/flat handstone
P88 k stone bead blank
B38 alt grinding slab
B38 alt quern with small central depression, broken
C38 omplete stone ring, limestone
S42 ne disc-shaped bead
R42 stone disc-shaped bead
S42 l bead, disc-shaped
R42 stone disc-shaped bead
R42 stone disc-shaped bead
S48 ne disc-shaped bead, Dabba marble
R60 stone disc-shaped bead
F58 t 'burnisher'?
F68 gment of Dabba marble
B68 alt handstone
F48 gments of Dabba marble
S78 ne bead blank, disc-shaped
S78 ne bead blank, disc-shaped
D48 ba marble fragments
R78 stone bead, disc-shaped
S48 ne bead, disc-shaped
R28 stone bead blank
F28 gment of Dabba marble
B34 alt circular/flat handstone
S0 ne ring fragment, limestone
P84 k stone bead, disc-shaped
P84 k stone bead, disc-shaped
B35 alt circular/flat handstone
B35 alt multiple tool: bifacial ovate/flat handstone – chopper

- B39alt bifacial ovate/planoconvex handstone, broken
- B39alt rubber
- Q22artz pebble
- S24he ring fragment, limestone?
- S68he ring fragment, limestone?
- W14k stone bead blank

Table 3.3 Burqu' 03000: special finds

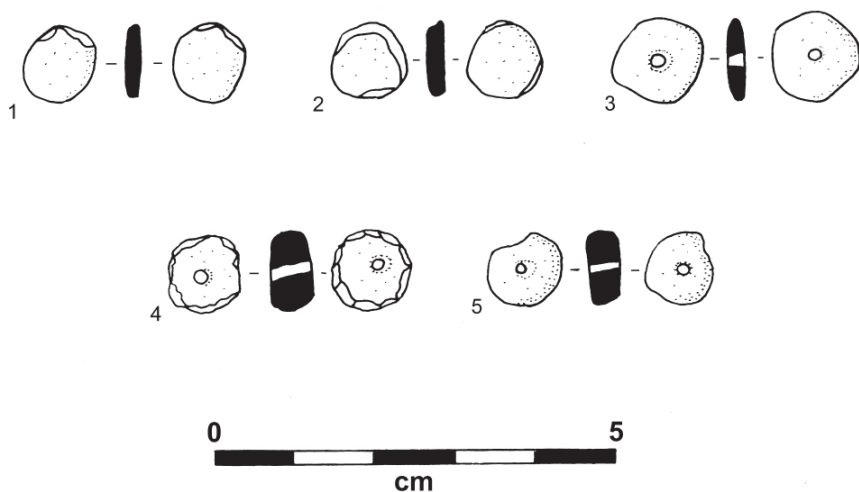


Figure 3.6 Burqu' 03000: stone beads and blanks. 1. 114/4; 2. 128/2; 3. 134/2; 4. 142/1; 5. 134/2

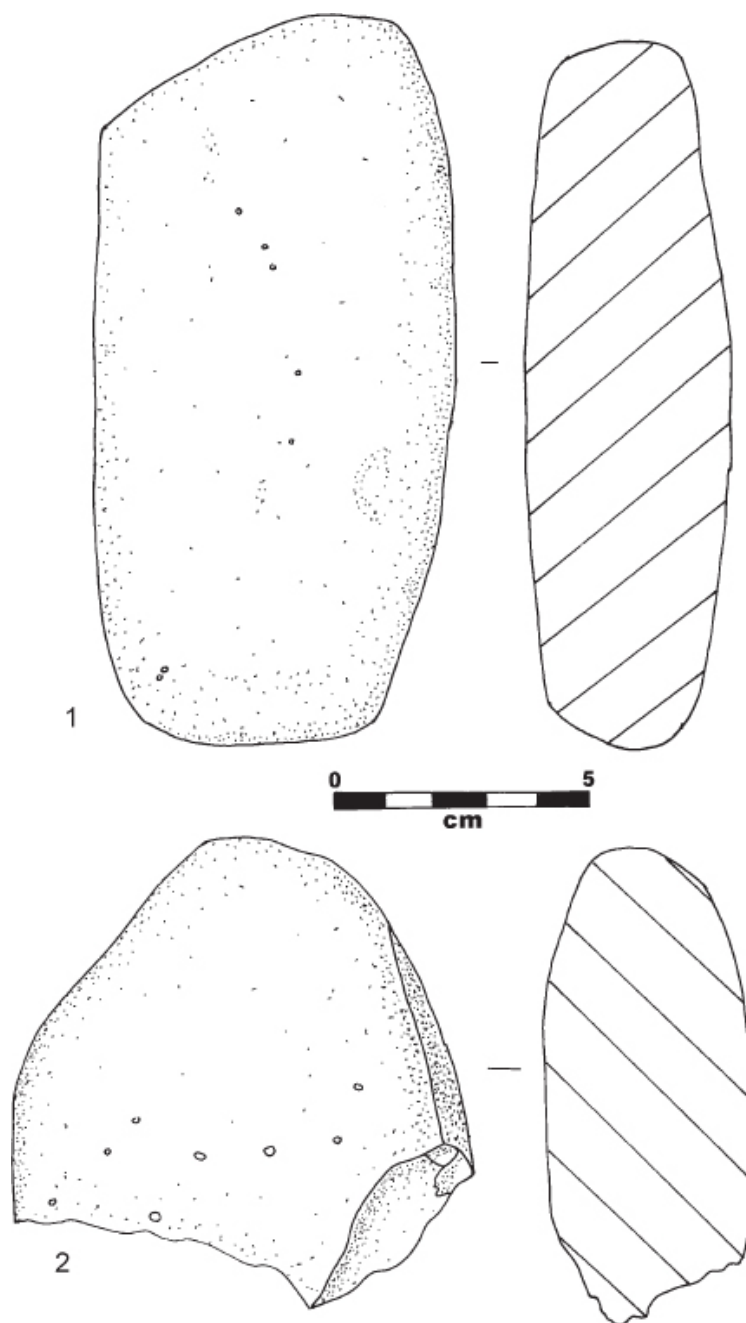


Figure 3.7 Burqu' 03000: ground stone. 1. 138/1 basalt handstone; 2. 139/2 basalt handstone

A number of beads and fragments of bead-making waste were also recovered, although no specific working area was found (Fig. 3.6). The beads are disc-shaped and made of shell, limestone and Dabba marble, the green apatite found in fossil springs at the head of Wadi Jilat, the latter indicating contacts with areas west of the *harra*. The other finds consisted of basalt handstones and querns (Figs 3.7–3.9) and one or two broken or unidentifiable pieces. The ground stone has been classified according to the typology presented by Wright (1998) for Dhuweila in Volume I of this series. Wright noted that a marked feature of the Late Neolithic assemblage at Dhuweila was the high proportion of tools which suggest grinding and cutting or chopping. In the Site 03000 assemblage, most were grinding tools, suggesting that the emphasis on hunting (and therefore butchery) at Dhuweila is not mirrored at Site 03000. While there was hunting (see ‘Faunal remains’, below), it appears to have played a less significant role in the economy at Burqu’ than it did at Dhuweila. An unusual feature of the ground-stone assemblage from the steppic sites is the use of large circular or sub-circular querns with small central depressions, normally only a few centimetres across and two or three centimetres deep (e.g. Betts 1998, 49, fig. 3.17 BA; 247, pls 5, 6). The fragmentary quern in Level 03138 is of this type (Fig. 3.9, 1). A similar quern was found at the PPNB/LN site of Ibn al-Ghazzi (Betts 1985). The presence of these grinding tools suggests that plant processing, of either wild or cultivated seeds and perhaps tubers, was taking place. No botanical material was recovered from the site, but the proximity to the flood plain of Wadi Qattafi would make at least chance agriculture a possibility. Botanical remains from Dhuweila (Colledge 1998) indicate wild einkorn, wild barley and *stipa* grass, as well as possibly edible tubers (Hather 1998).

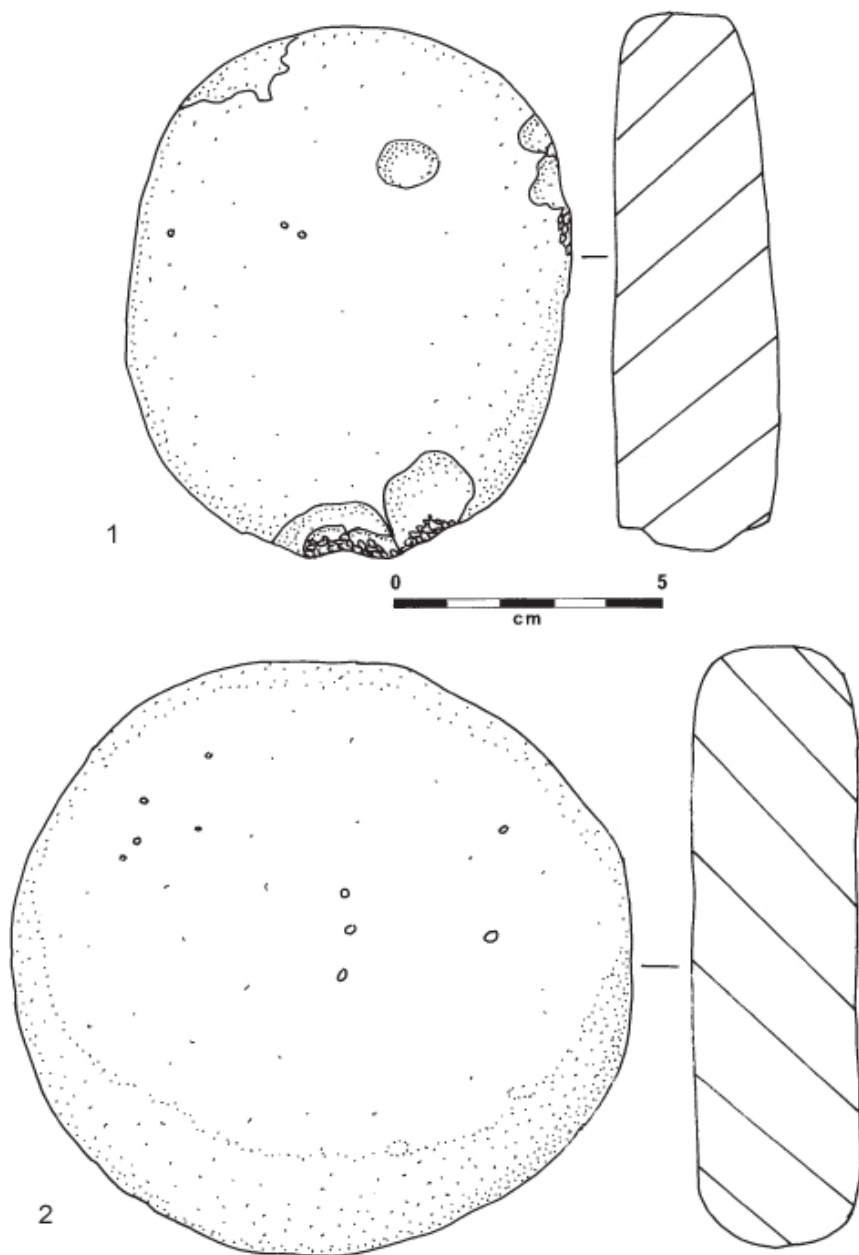


Figure 3.8 Burqu' 03000: ground stone. 1. 137/2 basalt multiple tool; 2. 134/2 basalt handstone

Chipped stone

Raw material

The raw material utilized for the assemblage is dominated by the locally available chert nodules which can be easily collected from the extensive surface scatters that surround the lake. The cherts are predominantly grey and brown in colour, with a relatively large proportion also of red and yellow. A single broken obsidian bladelet approximately 20 mm long was also recovered from Phase 1 (Level 03138). The source of the smokey-grey-black obsidian has not been determined.

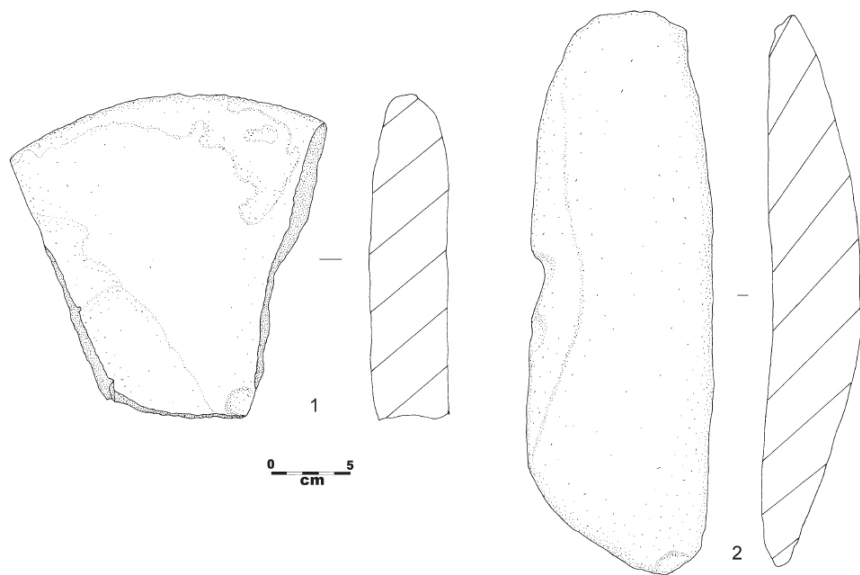


Figure 3.9 Burqu' 03000: ground stone. 1. 138/1 basalt quern; 2.138/1 basalt grinding slab

	1	2	3	4	5	6
Cores	19.00	38.00	17.00	1.00	35.00	11.00
%	15.70	31.40	14.05	0.83	28.93	9.09
Blanks	16.00	26.00	33.00	7.00	16.00	2.00
%	16.00	26.00	33.00	7.00	16.00	2.00
Total	35.00	64.00	50.00	8.00	54.00	13.00
%	15.63	28.57	22.32	3.37	24.11	5.80

Table 3.4 Burqu' 03000: raw material quality

One reason for the choice of this location for the site may have been the presence of comparatively good-quality chert nodules (66.5% belong to Types 1 to 3) from within the broader Burqu' chert *hammad*a (Table 3.4). This preference for better-quality raw materials is reminiscent of the assemblage belonging to Jebel Naja, but is similar also to the preference for higher-quality material shown at Burqu' 02000 (see below). In contrast to the sample from Jebel Naja, however, the

blank butts from Burqu' 03000 show few signs of butt deformation (13.0%), demonstrating that the material used was of a more moderate quality than that used at Jebel Naja. While this characteristic might indicate greater use of a soft hammer, it is more likely that the thick cortex present on the cobbles used had a significant effect in reducing the visibility of such features.

Within the Burqu' assemblages as a whole the highest proportions of tabular materials and artefacts produced on reused, previously knapped pieces (probably originally struck during the Palaeolithic) were found at Burqu' 03000 (Table 3.5). The reused pieces show a well-developed dark grey/black or dark orange 'desert varnish' patina and occur in percentages similar to the distribution of materials used at Jebel Naja, particularly in the core samples. Fresh tabular material was also utilized. This is not local to the lake-side environment and was probably brought to the site from outcrops located in the *hamad* (see also Betts 1987, 125 for a related discussion), perhaps for the production of the tabular knives present in the assemblage, and possibly also to augment the generally moderate quality of the raw materials available around the lake. While this latter inference needs to be confirmed or denied by a systematic investigation of the cherts available on the fringes of the *hamad*, it is clear that smaller proportions of non-local raw materials were brought to the Burqu' area than to elsewhere in the surrounding region, providing an indication of the relative lack of mobility of the occupants of sites like Burqu' 03000.

	<i>Tabular</i>	<i>Cobble</i>	<i>Wadi- pebble</i>	<i>Patina</i>	<i>None</i>
Cores	13.00	80.00	4.00	14.00	10.00
%	10.74	66.12	3.31	11.57	8.26
Blanks	9.00	46.00	0.00	12.00	33.00
%	9.00	46.00	0.00	12.00	33.00

Table 3.5 Burqu' 03000: cortex types

N	
2534	
10300	and core trimming elements
5254	
5251	
100300	

Table 3.6 Burqu' 03000: total assemblage count

N	
2534	
10300	kn
5251	
100300	-1
100300	-2
100300	-3

B118 e-1
B735 e-2
B784 e-3
B100 elet-1
B772 elet-2
B170 elet-3
B840 fragment
D231 form rejuvenation
S619 inter platform rejuvenation
C683 ted
G005 shot
G006 tablet
G402 and core fragment
T06401

Table 3.7 Burqu' 03000: artefact types - core reduction

Blank type
B118
B1278 /bladelet
S3614
Tool blank type
B1180
B804 /bladelet
S511
T511
B010 er

Table 3.8 Burqu' 03000: blank type utilization

Artefact counts

Tables 3.6 and 3.7 show that broken blank fragments and debris produced during the manufacture of numerous flakes, blades/bladelets and spalls were predominant in the Burqu' 03000 assemblage. The relatively numerous cores in the assemblage (Fig. 3.10), as well as the high numbers of blanks exhibiting cortex, indicate that individual cores were not heavily exploited, though the ratio of blanks to cores shows a significant level of core reduction in comparison to sites elsewhere in the Burqu' area. Considerable numbers of core trimming elements, including relatively high numbers of irregular crested blades and flakes, show that cores were shaped prior to blank production and that core platforms were maintained.

The percentages of each blank type produced and those selected for tool manufacture are listed in Table 3.8. As shown with the assemblage of Jebel Naja, the percentages of blade/bladelets, as well as spalls, are high at 03000, and are further reflected in the significant numbers of such blanks selected for tool manufacture. In contrast to the assemblage from Jebel Naja, where thick short blades were preferred, small blades, and particularly bladelets, were more prevalent in the Burqu' 03000 assemblage. This preference for diminutive lamellar blanks is also shown in the Burqu' 35000 assemblage (see below). In part, the production of significant numbers of small blades or bladelets represents a shift during the Late Neolithic from the long blade production of the preceding PPNB to smaller blanks required for the production of diminutive arrowhead types like

those utilized in the Burqu’ 03000 assemblage (Betts *et al.* 1998, 60–6; Baird 1993, 252–8). At Burqu’ bladelet rather than blade production is shown across all assemblages, and is a feature of the core technology that is also contingent upon the nature of the raw material, which is typically too small to support the production of long blades. It would appear that, while abundant, the cherts surrounding the lake were better suited to the industries that followed the PPNB, so that in later periods exploitation of local resources began to supplement the use of imported raw materials. Those blanks that were preferentially selected in the Burqu’ 03000 assemblage were utilized in the production of numerous burins made on blades and drill bits made on burin spalls in the tool sample, features that appear to be related to the expansion of ‘burin Neolithic’ sites such as Jebel Naja during the Late Neolithic (see Chapter 2; Finlayson and Betts 1991, 6; 1988, 389).

Core type
216 Alternating platform
7134 (amorphous)
609 Angle-of-orientation
3067 oidal
13537 on-flake
609 osed platform
3846 platform
38812 ered piece
4435 Blank dimensions
3040 mm
8126 ness

Table 3.9 Burqu’ 03000: core types

Butt type
500 pression
000 ex 3333.00Dihedral
2600 d
2800
1800 plain
2060 Blank dimensions
2078 mm
6147 ness
81183 width
8170 thickness

Table 3.10 Burqu’ 03000: butt types

Scar pattern
1600 irectional
400 ex
1700 sed
400 ial
5900 irectional

Table 3.11 Burqu’ 03000: dorsal scar patterns

Tool type
22720whhead
30369
305per
3183e
1277knife
3048r
3057
3074articulate
1004h
3110location
315Mixed piece
12833retouch
30620

Table 3.12 Burqu' 03000: major tool groups: absolute and relative counts

Core reduction methods

Both lamellar and flake blanks were struck from a variety of simple core types listed in Table 3.9. The percentages shown for each of the various core types show considerable similarity to those in the sample from Burqu' 35000, where splintered pieces also dominate the core type distribution. While a significant use of the bipolar-on-anvil technique at Burqu' 03000, like the use of cores-on-flakes, reflects the small size of the available raw material, the former technique is also useful for the production of bladelets as well as spall-like blanks, adding to the relative abundance (57.02%) of cores exhibiting blade/bladelet or spall scars. It is also notable that the 03000 knappers employed generalized opposed platform cores more frequently than those of the other assemblages around the lake. The average core dimensions of the Burqu' 03000 cores are smaller than most other core samples in the Burqu' cluster, being broadly parallel to the diminutive cores belonging to Site 02000 (see below). That this diminutive average core size, which is partly a function of small raw material size, is also at least in part a reflection of the intensity of core reduction is indicated by the relatively high percentage of exhausted cores (57.02%). Core discard for the reason of size (42.2%) is more frequent than discard as a result of knapping error (19.0% resulting in step scarring and 4.1% with overly obtuse platform angles) or problems dealing with the material's quality (5.0%). These data again correspond well with similar data from the Burqu' 35000 assemblage (see below).

<i>Tool type</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>++</i>
<i>Arrowhead</i>						
Amuq point	1	0	0	0	0	0
Byblos point	2	2	0	0	0	0
Badia point	0	1	0	0	0	0
Nizzanim point	0	6	0	3	1	1
Herzeliya point	0	1	0	0	0	0
Haparsa point	0	0	1	0	0	0
Transverse	0	0	2	0	0	0
Broken	2	7	1	0	0	1
<i>Burin</i>						
On break	6	18	4	0	1	1
Truncation	34	117	22	3	18	6
Dihedral	8	2	2	1	0	0
Nucleiform	2	0	0	0	0	0
Multiple mixed	2	6	0	0	0	0
Broken	12	13	7	1	0	17
<i>Scraper</i>						
Flake, various	4	2	2	0	0	1
Pebble flake	0	0	0	0	0	1
End on blade	3	0	1	0	0	0
End, other	2	4	1	0	0	1
Side	1	1	1	0	1	0
Round	1	0	0	1	0	0
Steep	3	1	2	1	0	0
Denticulate	1	2	0	0	2	0
Tabular	1	0	0	0	0	0
<i>Biface</i>						
Foliate	1	3	1	2	0	0
Axe/adze	0	0	0	0	0	0
Other	1	0	0	0	0	0
<i>Tile knife</i>						
Bifacial knife	5	5	2	0	0	0
<i>Borer</i>						
Borer on blade	2	0	2	0	0	0
Borer on flake	1	0	3	0	0	0
<i>Drill</i>						
Drill on spall	19	14	7	11	0	1
<i>Denticulate</i>						
On blade	1	1	1	0	0	0
On flake	1	1	0	0	0	0
Other	0	0	0	0	0	0
<i>Notch</i>						
On flake	2	1	3	1	0	0
On blade	0	0	0	0	0	0
<i>Truncation</i>						
On flake	5	0	6	0	0	0
On blade	2	3	3	1	0	0
On pebble flake	0	0	0	0	0	0
On chip	1	0	0	0	0	0
<i>Mixed piece</i>						
Various	1	0	0	0	0	0
<i>Retouched piece</i>						
Blade	15	11	9	2	1	3
Bladelet	1	0	0	0	0	0
Flake	22	12	21	4	1	5
Chip	18	4	8	1	0	0
Chunk	1	0	1	0	0	0
Miscellaneous	17	10	8	8	1	4
Total	201	248	121	40	26	42

Table 3.13 Burqu' 03000: tool types: absolute counts by phase

Counts						Weights (g)				
Phase	Context	Non-IDs	IDs	Total numbers	%ID	Non-IDs	IDs	Total weight	%ID	
1	107	30	2	32	6.0	20	0	20	0.0	
1	138	534	21	555	3.8	425	20	445	4.5	
1	140	108	3	111	2.7	61	2	63	3.2	
1	142	229	9	238	3.8	220	25	245	10.2	
1	144	16	0	16	0.0	5	0	5	0.0	
1	145	14	0	14	0.0	5	0	5	0.0	
1	146	50	7	57	12.2	45	7	52	13.5	
1	147	147	1	148	0.7	102	5	107	4.7	
1	148	130	12	142	8.5	165	20	185	10.8	
1	149	125	10	135	7.4	70	5	75	6.7	
1	152	6	1	7	14.3	2	1	3	33.3	
1	153	11	0	11	0.0	7	0	7	0.0	
1	154	44	5	49	10.2	40	5	45	11.1	
1	156	1	0	1	0.0	1	0	1	0.0	
1	157	44	2	46	4.3	45	1	46	2.2	
1	160	84	2	85	2.4	60	1	61	1.6	
1	163	70	1	71	1.4	50	2	52	3.8	
1	169	34	0	34	0.0	20	0	20	0.0	
1	178	42	4	46	8.7	20	5	25	20.0	
1	188	27	3	30	10.0	30	1	31	3.2	
2	128	616	24	640	3.8	410	70	480	14.6	
2	132	374	12	386	3.1	210	20	230	8.7	
2	134	703	29	732	4.0	527	55	582	9.5	
2	135	50	0	50	0.0	40	0	40	0.0	
2	136	163	2	165	1.2	120	15	135	11.1	
2	137	120	2	122	1.6	90	2	92	2.2	
2	139	39	0	39	0.0	35	0	35	0.0	
2	141	50	1	51	2.0	30	1	31	3.2	
2	143	49	0	49	0.0	30	0	30	0.0	
2	155	9	0	9	0.0	3	0	3	0.0	
2	164	11	0	11	0.0	2	0	2	0.0	
2	165	27	1	28	3.6	15	1	16	6.3	
2	167	6	0	6	0.0	2	0	2	0.0	
3	115	3	1	4	25.0	1	1	2	50.0	
3	116	15	3	18	16.7	10	1	11	9.0	
3	117	51	2	53	3.8	35	1	36	2.8	
3	118	44	1	45	2.2	20	2	22	9.0	
3	120	66	8	74	10.8	40	2	42	4.8	
3	122	407	44	451	9.8	300	85	385	22.0	
3	123	56	1	57	1.8	56	1	57	1.8	
3	124	12	0	12	0.0	10	0	10	0.0	
3	126	67	2	69	2.9	60	3	63	4.8	
3	127	289	11	300	3.7	175	25	200	12.5	
3	130	72	0	72	0.0	60	0	60	0.0	
3	131	14	0	14	0.0	10	0	10	0.0	
3	133	121	1	122	0.8	95	1	96	1.0	
3	158	3	0	3	0.0	1	0	1	0.0	
4	108	15	0	15	0.0	20	0	20	0.0	
4	109	46	2	48	4.2	30	5	35	14.3	
4	110	27	2	29	6.9	12	5	17	29.4	
4	112	9	0	9	0.0	5	0	5	0.0	
4	113	35	5	40	12.5	30	5	35	14.3	
Total		5315	237	5551						

Table 3.14. *Burqu' 03000: counts and weights of identifiable v. unidentifiable animal bones by context, ordered by phase. The percentages of identifiable bones are shown in bold in right hand columns*

Blank variables

Butt types, shown in Table 3.10, demonstrate a significant percentage of compression butts, produced by the use of the bipolar-on-anvil technique. The greater care employed in the shaping of the cores utilized at Site 03000 is reflected by a lower percentage of cortical butts in comparison to other Burqu' assemblages.

In contrast, somewhat higher percentages of both faceted and plain butts were documented.

	<i>Phase</i>					<i>Total</i>
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	
Equid	1	2	2	0	0	5
Sheep/goat/gazelle	12	10	19	3	0	44
Sheep/goat	34	44	23	1	0	102
Gazelle	17	4	6	1	0	28
Dog/wolf	4	0	3	1	0	8
Hare	9	8	13	3	0	33
Hedgehog	0	2	0	0	0	2
Jaculus	0	1	0	0	0	1
Bird	6	0	8	0	0	14
Total	83	71	74	9	0	237

Table 3.15a Burqu' 03000: animal remains (NISPs per phase of occupation)

<i>Taxafmotal</i>
Equid
Sheep/goat/gazelle
Sheep/goat
Gazelle
Dog/wolf
Hare
Bird
Total

Table 3.15b Burqu' 03000: relative proportions of taxa (all phases combined)

The average blank dimensions for the Burqu' 03000 assemblage (Table 3.10) are consistent with the relatively small average core size discussed above. The blanks are also characterized by variables including the relatively infrequent presence of a lip (27.0%) and ventral bulbs defined by salient types (48.0%), which suggest the use of a hard hammer knapping technique in the Burqu' 03000 assemblage, as with other assemblages around the lake. The significant utilization of the bipolar-on-anvil technique is reflected in the Burqu' 03000 blank sample by the high percentage of flat ventral surfaces (31.0%) that characterize compression fractures.

The dorsal scar patterns shown in Table 3.11, which illustrate a relatively significant percentage of bidirectional examples, are technically consistent with the core type data presented above. The overall dominance of the unidirectional pattern, a feature shared by Late Neolithic assemblages across the Levant, is marked and consistent with other samples collected in the Burqu' area.

Tool typology

The tool kit is limited (Tables 3.12 and 3.13). It is dominated by burins (44.7%), a large proportion of which are on truncations. Projectile points count for less than 5% of the tool kit. Scrapers, notched and denticulated pieces and bifacial tools occur in low numbers. There is a high proportion of drills on spalls (7.7%). A number of the retouched pieces were derived from earlier sources, either occurring accidentally in and around the site or perhaps being picked up and reused by late Neolithic occupants; among these pieces were Levallois points and backed and truncated bladelets. There is some variety among the types of arrowheads found at the site. All are recognizable Late Neolithic forms, being small, tanged or leaf-shaped and fashioned by unifacial or bifacial pressure flaking. The most common types are leaf-shaped and tanged pieces broadly corresponding to Herzliya and Nizzanim points found in Late Neolithic contexts in the more verdant areas. Byblos points and a single Badia point came from the earliest two phases. Only two transverse arrowheads were recovered. The scrapers are not very diagnostic; most are roughly shaped on irregular flakes and show little typological distinction. End scrapers on short blades occur occasionally. Tools in the bifacial class are predominantly foliate in form, but are varied and rather roughly made, and a considerable number are broken. It is possible that their scarcity may be due to the lack of suitable thin tabular chert. The drills on burin spalls may have been used in the production of the soft stone beads recovered from the site. Notched and denticulated pieces were also relatively undiagnostic. Most of the denticulates had steep scalar retouch and between three and five deep irregular indentations.

The toolkit gives few clues as to the economy of the site. The low proportions of arrowheads suggest that hunting played a fairly restricted role. The reasons for the occurrence of high numbers of truncation burins in Late Neolithic sites of the steppic zone is as yet unexplained, beyond the provision of spalls for drill bits, and so the dominance of this form in the tool kit does not help in interpretation, except in typological comparisons with other sites.

Faunal remains

Of a total of 5551 animal bones from Site 03000, 237 were identifiable (4.3%). Table 3.14 shows the proportions of identified material for each phase, demonstrating how high fragmentation has rendered much of the material 'unidentified' (with proportions of identified material generally being slightly higher by weight than count). Of the identified material, 223 fragments belong to mammals and 14 to birds (see Table 3.15a).

Table 3.15b shows that 43.0% of the total assemblage (all phases combined) belong to sheep/goat, and hence this taxon dominates. Separation of sheep and goat bones and a discussion of their management will be the topic of a separate paper. Here, it is assumed (on the basis of arguments presented for Burqu' 27000, below) only that the caprines represent imported domestic stock. The relatively high proportion (19.0%) of bones attributed to sheep/goat/gazelle attests to the difficulty of assigning material to taxon when it is highly fragmented. In terms of wild mammalian fauna, gazelle make up 12.0% of the assemblage and equids 2.0%. Hare are most frequent of the smaller mammals (14.0% of the total), and there is a notable absence of fox.

Discussion

The equid remains are likely to belong to either the wild *Equus hemionus* or possibly *E. africanus*, since the larger *Equus caballus* has not been identified from Holocene deposits in the Jordanian steppe. In terms of body parts, the sample (n=5) is clearly very small, and tooth fragments and extremities are likely to be those which are identifiable under conditions of high fragmentation.

Taxa and skeletal parts

Skeletal parts
Phase 1
148 agments: tooth fragment
158 agments: 1 proximal metacarpal, 1 proximal metatarsal, 1 mandible fragment
242 agments: 1 radius shaft, 1 distal metapodial
546 agments: 1 pelvis, 1 vertebra, 2 mandible with teeth, 1 mandible condyle
147 agments: 1 proximal metatarsal
358 agments: 2 distal humerus, 1 proximal radius, 1 phalanx 2, 1 phalanx 3 fragment, 1 calcaneum, 1 maxilla with teeth
140 agments: 1 proximal phalanx 1
242 agments: 1 distal phalanx 1, 1 astragalus
246 agments: 1 distal metapodial, 1 phalanx 2
748 agments: 2 radius, 1 proximal metatarsal, 1 distal metapodial, 2 phalanx 1, 1 phalanx 2
748 agments: 1 pelvis, 1 proximal metacarpal, 2 phalanx 1, 1 phalanx 2, 1 mandible condyle, 1 maxilla with teeth
152 agments: 1 phalanx 3
154 agments: 1 phalanx 3
157 agments: 1 astragalus
278 agments: 1 phalanx 2, 1 skull
388 agments: 2 radius, 1 skull
660 agments: 2 distal metapodial
338 agments: 2 phalanx 1, 1 phalanx 2
442 agments: 1 malleolus, 1 proximal metatarsal, 1 phalanx 1, 1 mandible
248 agments: 1 phalanx 1, 1 mandible
149 agments: 1 naviculo-cuboid
454 agments: 2 distal metacarpal, 2 distal metatarsal
178 agments: 1 astragalus
240 agments: 1 phalanx 1, 1 phalanx 2
149 agments: 1 phalanx 2
157 agments: 1 phalanx 1
448 agments: 1 tibia, 2 metacarpal, 1 mandible
142 agments: 1 phalanx 1
248 agments: 1 humerus, 1 pelvis
149 agments: 1 calcaneum
178 agments: 1 calcaneum
Phase 2
248 agments: 1 phalanx 1 shaft, 1 maxilla with tooth
558 agments: 1 scapula, 1 humerus shaft, 2 phalanx 3, 1 mandible
232 agments: 1 distal femur, 1 maxilla with tooth
334 agments: 1 scapula, 1 proximal metatarsal, 1 atlas
528 agments: 1 ulna shaft, 1 pelvis acetabulum, 1 proximal and 1 distal metacarpal, 2

distal metapodia, 1 phalanx 1, 1 phalanx 3, 1 scaphoid, 1 os chrochum, 1 mandible condyle, 3 maxilla with teeth

~~532~~agments: 1 distal metacarpal, 1 metatarsal, 1 sesamoid, 1 capetum-trapezoid, 1 grand cuneiform

~~204~~ragments: 2 proximal and 1 distal metatarsal, 2 distal metapodia, 4 phalanx 1, 5 phalanx 2, 1 scaphoid, 1 pyramidal, 1 astragalus, 3 mandible with teeth

~~236~~ragments: 1 distal humerus (identified as goat), 1 sternum fragment

~~237~~ragments: 1 phalanx 1, 1 phalanx 2

~~141~~ragment: 1 phalanx 1

~~628~~egment: 1 mandible with teeth

~~332~~ragments: 1 proximal metatarsal, 1 calcaneum, 1 mandible

~~118~~ragments: 2 phalanx 2

~~132~~ragment: 1 phalanx 2

~~434~~ragments: 1 distal humerus, 1 pelvis, 1 phalanx 1, 1 phalanx 2

~~165~~ragment: 1 humerus

~~284~~ragments: 1 distal humerus, 1 femur

~~100~~ragment: mandible with teeth

Phase 3

~~121~~ragment: 1 distal metapodial

~~127~~ragment: 1 phalanx 1

~~580~~ep/goat/gazelle humerus shaft, 1 pelvis, 9 vertebra, 6 teeth fragments, 1 skull

~~126~~ragment: 1 skull

~~510~~ep/goat metacarpal

~~132~~ragments: 1 pelvis, 1 proximal femur, 2 distal metacarpal, 2 distal metatarsal, 3 phalanx 1, 1 phalanx 3, 1 astragalus, 3 mandibular condyle, 1 maxilla with teeth

~~627~~ragments: 1 proximal radius, 1 radius shaft, 1 distal tibia, 1 proximal metacarpal, 1 astragalus, 1 vertebra

~~133~~ragment: 1 maxilla with teeth

~~616~~egment: phalanx 2

~~422~~ragments: 1 radius, 1 phalange 2, 1 phalanx 3, 1 mandibular condyle

~~126~~ragment: 1 phalanx 1

~~177~~ragment: 1 phalanx 1

~~220~~ragments: 1 proximal metacarpal, 1 distal metacarpal

~~115~~ragment: 1 proximal metacarpal

~~320~~ragments: 1 pelvis, 2 calcaneum

~~622~~ragments: 2 distal humerus, 1 femur, 1 metacarpal, 2 calcaneum

~~227~~ragments: 1 pelvis, 1 phalanx 1

~~123~~ragment: 1 pelvis

Phase 4

~~510~~ep/goat/gazelle humerus fragment

~~210~~ragments: thoracic and caudal vertebrae

~~510~~ep/goat proximal radius

~~613~~egment: naviculo-cuboid

~~100~~ragment: mandible with teeth

~~115~~ragments: 2 radius, 1 proximal metatarsal

Phase 5

There was no animal bone material from Phase 5

There has been no further separation of sheep and goat subsequent to the initial analysis. All body areas are represented, with the denser small bones (phalanges, carpals, tarsals) and the better-surviving and diagnostic longbone ends (especially metapodia) more strongly represented. Some teeth and jaw fragments are also present, although their condition makes it difficult to extract dental ageing data.

Although gazelle bones are present in smaller numbers, the body part representation shows a similar pattern to sheep and goat. The hare remains show that all general body areas are represented, but nearly all of the small collection of *Canis* bones are foot bones except one mandible fragment (a pattern which could result from the difficulty of identifying fragmented longbones).

Identifiable sheep/goat bones represent a little under half of the total, with the sheep/goat/gazelle category at almost a fifth of the total. Overall, sheep/goat is most strongly represented, followed by gazelle and hare. The sheep/goat numbers are high from the earliest levels onwards, while the gazelle numbers are high in Phase 1 but fall back, to be superseded by smaller game. The evidence supports the theory that the inhabitants were hunter-foragers in an interim stage of adopting domestic sheep/goat into their subsistence strategy. The condition of the faunal remains does not permit a clear identification of domestication, but evidence from Wadi Jilat suggests that they represent introduced herds (Garrard *et al.* 1996, 218).

Summary

The Burqu' sites show a uniformity of cultural development over extended periods of time. Basic architectural techniques show little alteration, and it is largely in the chipped stone repertoire that signs of change can be detected. Like most of the Burqu' prehistoric camps, Site 03000 has indications of fairly regular reuse, possibly on a seasonal basis. The basic site plan resembles Dhuweila (Betts *et al.* 1998), following on the PPNB traditions there, in that it consists of a number of irregular cells built using a variety of different methods. There are several pits cut into bedrock at the base of the occupation levels. Construction techniques involve both simple drystone walling and the upright-slab-with-packing technique. There is no obvious chronological order to these; they appear together at sites, apparently at random. A mixture of both construction techniques in basalt was found at Dhuweila (Betts *et al.* 1998, 44), while the upright slab technique was used extensively from the PPNB onwards in the western limestone regions, as at Wadi Jilat and Azraq (e.g. Baird *et al.* 1992, figs 6, 7), and has parallels as far afield as Sinai and the Negev (e.g. Tchernov and Bar-Yosef 1982 [Wadi Theik – Sinai]).

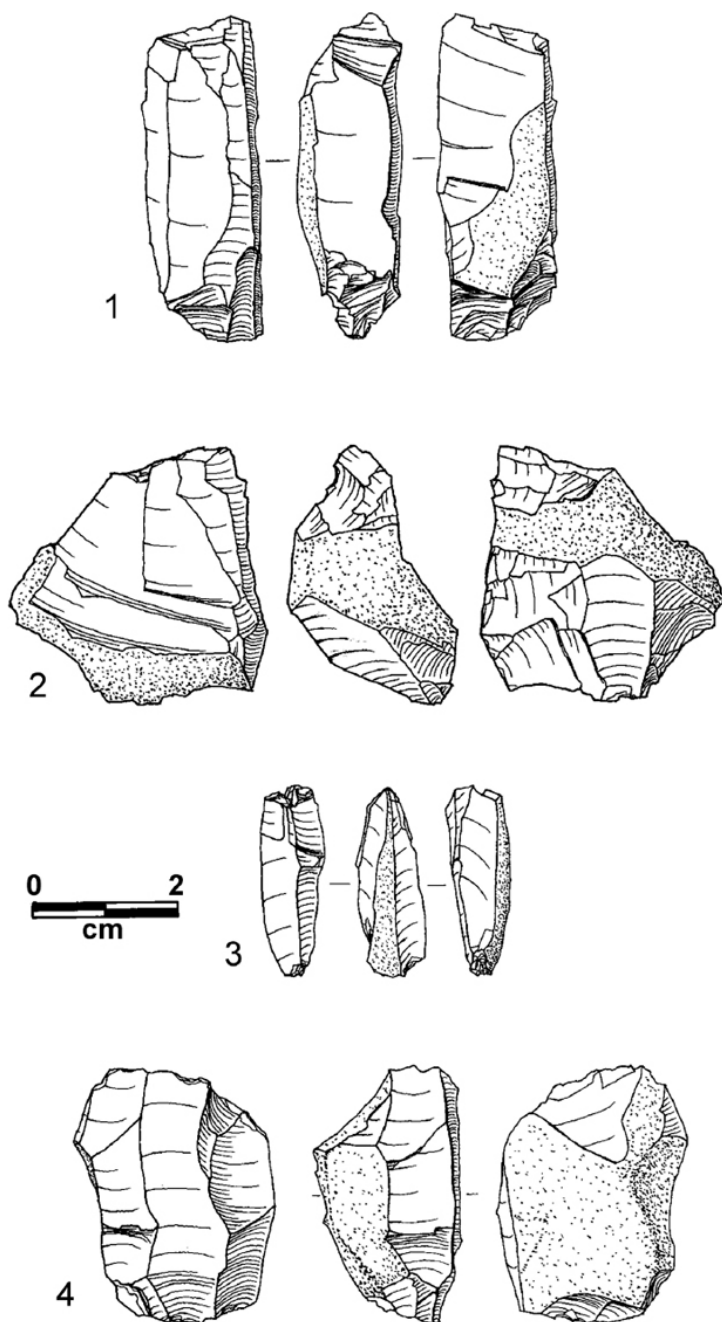


Figure 3.10 Burqu' 03000: chipped stone. 1. Splintered core; 2. Crossed platform core; 3. Splintered core; 4. Opposed platform core

The date for Burqu' 03000 indicates use in the mid-Late Neolithic, but this date was obtained from Phase 3, the latest occupation phase, while the main occupation is associated with Phase 2. Within the stone tool assemblage the arrowheads are the most sensitive diagnostic artefacts. The later transverse arrowhead forms do not appear until Phase 3, while Nizzanim points dominate in Phase 2. These typically appear slightly earlier in the Late Neolithic sequence. Byblos and Badia points also occur in Phase 2. In Phase 1, only Byblos and Amuq points were recovered. The lithic technology is most closely paralleled at Burqu' 35000, the earliest of the studied Burqu' sites. Surface finds from Site 03000 do not indicate use in later periods, so it is probable that the site was first established in the Early Late Neolithic or the start of the Late Neolithic and saw sporadic use up until the mid-Late Neolithic. This is significant from the point of view of the faunal remains, as a predominance of sheep/goat bones occurs from the earliest stage onwards.

<i>Description</i>
<i>Phase ++</i>
L00 se sand, rocks and windblown deposits surface
200 100
<i>Phase 5</i>
000 y sandy topsoil, deflated occupation deposits
R00 ble and windblown sand
<i>Phase 4</i>
H00 arth
C00 mpact pale grey gritty layer
C00 mpact sandy layer
P05
L00 t sandy occupation layer
D07 kish sandy occupation layer
C00 mpact yellow sandy layer
<i>Phase 3</i>
L00 se dark loamy occupation layer, charcoal and burnt bone
H00 arth
L00 se dark occupation layer
H00 arth
203 108
200 se pale loamy layer
205 10
<i>Phase 2</i>
R00 -brown compact fill
P13 fill similar to 112
H00 arth
W15 ite limestone gravel surface
Y00 ow sand with flecks of charcoal
P17
206 14, continuation of hearth
207 12
200 arth
200 arth
210 15
211 16
<i>Phase 1</i>
D00 k ashy layer on bedrock

Dark sandy layer on bedrock
Decayed basalt subsoil

Table 3.16 Burqu' 35000: contexts by phases

Site 35000

Site 35000 was selected because of an extensive scatter of surface artefacts adjacent to a large cairn, probably a later burial covering prehistoric structures. Trench 100, which was 2.5 m \times 1.4 m in area, was laid out on the south side of the cairn, and Trench 200, which was 6.0 m \times 0.8 m, was cleared of surface rubble. Owing to time constraints it was not possible to complete excavation of the full area to bedrock. A sounding of 1.0 m \times 0.8 m was cut into Trench 200 at the northern end, where a pit was revealed after initial clearance. Most of Trench 100 was excavated with the exception of the lowest levels, which were uncovered only in a sounding 1.4 m \times 1.4 m. The site proved to have a relatively complex sequence of occupation levels, including a dense concentration of hearths and small pits (Fig. 3.11). No structures were defined within the excavated areas.

Dating

Owing to the rich ashy nature of the deposits it was possible to obtain three radiocarbon dates from Phase 2 of Site 35000, all within a fairly close range: (35112) OxA-2770 8270 \pm 80 BP (7440–7050 cal. BC), (35208) OxA-2769 8180 \pm 80 BP (7270–7040 cal. BC) and (35207) OxA-2768 8140 \pm 90 BP (7420–6990 cal. BC). Context 35208 is a hearth cut into the compact gravel occupation surface, 35207 is the occupation surface itself, dated by fragments of charcoal interspersed with the limestone pebbles, and 35112 is the fill of a pit cut through the gravel surface from the base of which a charcoal sample was taken.

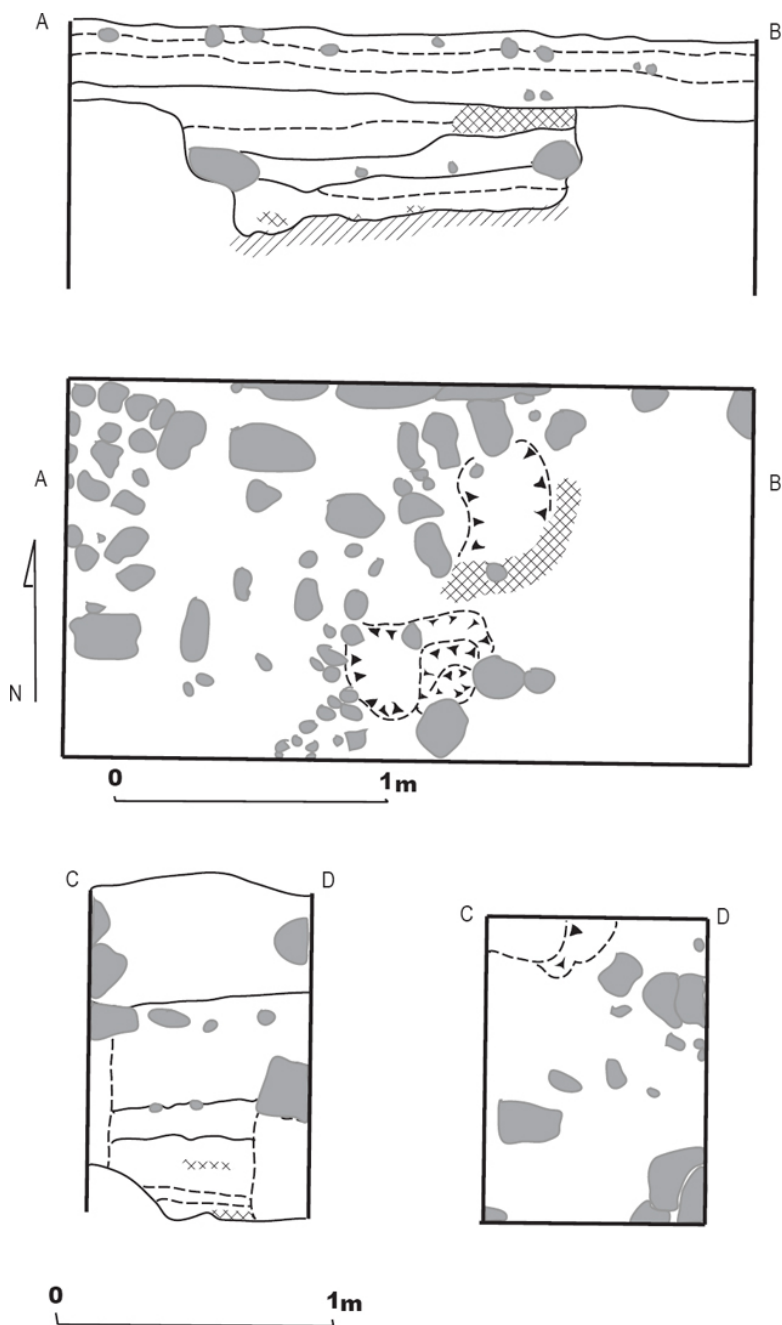


Figure 3.11 Burqu' 35000: plans and sections

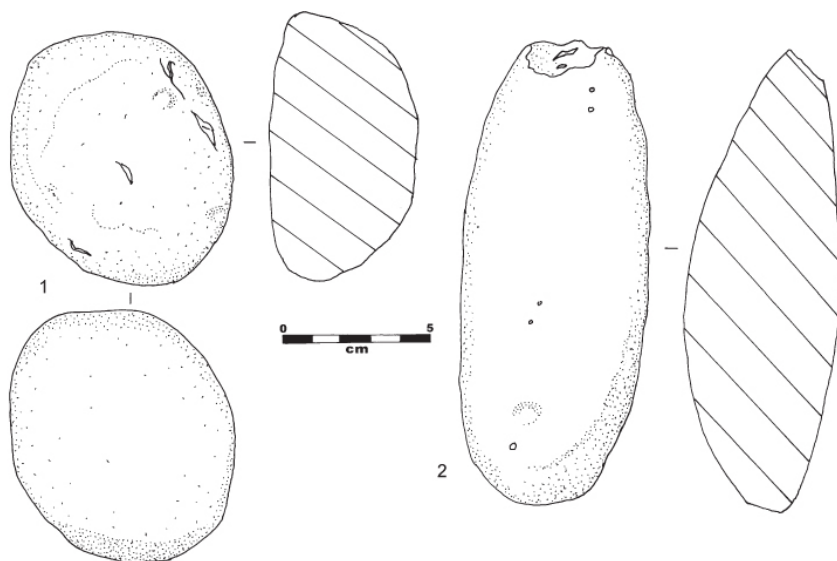


Figure 3.12 Burqu' 35000: ground stone. 1. 106/4 basalt handstone/pounder; 2. 107/4 basalt handstone

Description

~~106~~ and basalt handstone/pounder

~~107~~facial ovate/plano-convex basalt handstone

~~107~~ced shell

~~100~~ba marble fragments and bead blanks

Table 3.17 Burqu' 35000: special finds

Stratigraphy

Phase 1

The earliest levels were reached only in a sondage cut into the base of Trench 100. They consist of dark sandy and organic deposits which may be pit fills, but the small area of exposure made it difficult to determine this exactly. As at several other sites, including Dhuweila, they may represent pits cut into bedrock.

Phase 2

Phase 2 comprises a compact whitish layer of crushed limestone forming a rough surface over sand and covered by a thin reddish-brown deposit. Four hearths were cut into the limestone layer.

Phase 3

Phase 3 consists of very dark brown sediment with two hearths. This phase yielded few artefacts but a dense localized concentration of bone.

Phase 4

Phase 4, the uppermost occupation phase, consists of light-coloured sandy deposits with a high concentration of artefacts and basalt rubble. Several pits and hearths were also associated with this phase.

Phase 5

Phase 5 consists only of sandy topsoil with basalt rubble and deflated occupation deposits.

Phasing

+ + Unstratified surface collections

5. Topsoil, windblown sand and basalt rubble

4. Occupation deposits with hearths and pits, basalt rubble

3. Dark loose sediment, hearths and pits, few artefacts

2. Compact layer over sand with hearths and pits

1. Pits and occupation levels above or cut into bedrock

For contexts by phase, see Table 3.16

Special finds

The only stratified finds from 35000 were two basalt handstones (Fig. 3.12) and a pierced shell (Table 3.17).

	1	2	3	4	5	6
Cores	3	30	8	13	30	25
%	2.75	27.52	7.34	11.93	27.52	22.94
Blanks	2	24	7	14	16	37
%	2.00	24.0	7.0	14.0	16.0	37.0
Total	5	54	15	27	46	62
%	2.39	25.84	7.18	12.92	22.01	29.67

Table 3.18 Burqu' 35000: raw material quality

	Tabular	Cobble	Wadi-pebble	Patina	None
Cores	9	72	0	9	19
%	8.26	66.06	0.00	8.26	17.43
Blanks	17	44	1	7	31
%	17.0	44.0	1.0	7.0	31.0

Table 3.19 Burqu' 35000: cortex types

Chipped stone

Raw materials

Raw material data collected for cores and blanks are presented below in Tables 3.18 and 3.19. The tool sample is dominated by non-local creamy flint; in contrast, most of the debitage consisted of grey and brown cherts obtained from the local Burqu’ cobbles.

The apparent distinction between the debitage and core materials and the tool samples in terms of material quality is reflected in a peak of tool materials at Type 2, in comparison with the majority of non-tools (64.6%), both cores and blanks, which are assigned to the poorer-quality chert types (Types 5 and 6). This dichotomy between better-quality and poorer-quality material types is more pronounced at Burqu’ 35000 than in other Burqu’ assemblages. In total, the assemblage of Burqu’ 35000 also exhibits the poorest overall material quality of any of the Burqu’ sites, a feature reflected in the lowest percentages of butt deformation characteristics across the Burqu’ samples (only 7.0% crushed butts, and 9.0% of butts with ring cracks). This suggests both that the site was not selected for relative material quality and that augmenting the raw material base with better-quality non-local chert was more critical here than elsewhere to the overall reduction strategy employed. In sum, the Burqu’ 35000 assemblage appears to demonstrate the characteristic requirement for good-quality chert for formal tool manufacture versus the use of poorer-quality materials in a more *ad hoc* manner that is indicative of PPNB/C (Early Late Neolithic) sites across the Levant (McCartney and Gratuze 2003, 15).

A significant amount of tabular materials, in addition to the non-cortical pieces, reflects the presence of the higher-quality non-local materials, probably imported from the adjacent limestone *hammada* where such tabular materials outcrop. These materials, as well as examples exhibiting the ‘desert varnish’ type of heavy patina, represent the augmentation of local poorer-quality materials by the Burqu’ 35000 knappers. In contrast, the dominant cobble form in both core and blank samples shows the utilization of the local Burqu’ cherts. The greater presence of these poorer-quality materials in the debitage samples documented in Table 3.19 agrees with the relatively *ad hoc* manner in which the poorer-quality materials were approached, in contrast with the more consistent appearance of better-quality materials in resulting tool forms.

N	
2416s	
2416s	cores and core trimming elements
2416s	
2416s	
2416s	

Table 3.20 Burqu’ 35000: total assemblage count

N	
2416s	
2416s	blank
2416s	
2416s	2416e-1
2416s	2416e-2

2166 e-3
2111 e-1
2106 e-2
2154 e-3
2100 elet-1
2127 elet-2
2128 elet-3
2189 fragment
2157 form rejuvenation
2105 inter platform rejuvenation
2103 ted
2102 shot
2102 tablet
2102 s and core fragment
25000

Table 3.21 Burqu' 35000: artefact types - core reduction

Artefact counts

The total assemblage category counts shown in Table 3.20 demonstrate a different type of assemblage from those seen at most of the Burqu' sites. Both blank and core artefacts are reduced in number and the tools represent a comparatively small proportion of the total assemblage. Instead, the assemblage is heavily dominated by waste, a feature at least partly related to the relatively poor quality of cherts available at the site. Such cherts would have generated not only a greater amount of waste for discard, but also, as the distribution shown in Table 3.20 suggests, a pattern in which tools and usable core materials of better-quality chert are likely to have been removed from the site for use elsewhere.

The percentages of cores and core fragments belonging to the Burqu' 35000 assemblage are the lowest of any assemblage collected in the Burqu' area (Table 3.21). The numbers of core trimming elements are, however, significant on-site reduction of core material. While cores appear to be relatively infrequent in the Burqu' 35000 sample, the blank to core ratio (5.2:1) is consistent with other assemblages in the Burqu' area. The core trimming elements demonstrate that a significant amount of attention was paid to core shaping, with even more frequent attention paid to the rejuvenation of core platforms. As with other Burqu' assemblages, cortical blanks overwhelmingly dominate the flake, blade and bladelet samples, demonstrating the primary core reduction that took place on site and providing a contrast to the greater presence of non-cortical varieties in the PPNB as well as Late Neolithic Dhuweila samples (Betts *et al.* 1998, table 4.4). It is notable, in comparison, to see a greater production of cortical blades at Jebel Naja, indicating a preference for the naturally backed pieces documented for that assemblage (see Chapter 2). These characteristics demonstrate similarities between the assemblages of Burqu' 35000 and of Jebel Naja despite features of the former assemblage that fit best within the local raw material economy of the Burqu' area.

Blank type
21158
21238 /bladelet
33214

Table 3.22 Burqu' 35000: blank type utilization

The distribution of the different blank and tool blank types demonstrates the greater preference for both the blade/bladelet and spall types seen previously in the Burqu' 03000 assemblage (Table 3.22). The percentage of blades/bladelets is, however, somewhat higher in the Burqu' 35000 assemblage at the expense of tools made on more irregular blanks belonging in the 'other' category. As at Burqu' 03000 and Jebel Naja, this preference for blade/bladelets is accounted for, at least in part, by a high percentage of burins in the assemblage. Similarly, the high number of spalls is linked to the numerous drills belonging to these assemblages (Finlayson and Betts 1991, 7; Betts 1988, 389; see also p. 31 above). These features suggest that the Burqu' 35000 assemblage fits best with the 'burin sites' that became a more prominent feature of the subsequent Late Neolithic.

Core reduction methods

In general, the distribution of the various core types across the Burqu' 35000 sample demonstrates the preferences also shown by the Burqu' 03000 sample (Table 3.23; Fig. 3.13). In particular, the high degree of utilization of the bipolar-on-anvil technique shows the heavy exploitation of non-local cherts as well as the need for small lamellar blanks. The Burqu' 35000 assemblage thus provides a good comparison for the presence of this strategy in the LPPNB assemblage of Dhuweila (Betts *et al.* 1998, 74–8). Cores more exclusively used for the production of flakes, such as the alternating platform or discoidal types, were not as frequent in the Burqu' 35000 sample. Also corresponding to the distinct preference for the production of lamellar blank types is the high percentage of cores (51.4%) in the Burqu' 35000 assemblage exhibiting negative blade/bladelet scars. The corresponding data of blank type and the latter characteristic clearly demonstrate that lamellar blanks were produced at the site. The greater prominence of more *ad hoc* flake cores in the core sample here than elsewhere, therefore, appears to indicate a significant amount of recycling of blade/bladelet cores related to the intensive pattern of chert exploitation seen in the assemblage generally. A feature which corresponds with this is the very high percentage of cores that can be defined as fully exhausted (75.2%). Common reasons for core discard were knapping errors such as step fractures (24.8%) and overly obtuse striking platforms (6.4%), although comparatively more cores than elsewhere were discarded in the Burqu' 35000 assemblage because of poor raw material quality (10.1%). The rest of the cores were discarded because of their diminutive size (43.1%). However, one feature that may correspond to the earlier date assigned to the site of Burqu' 35000 (see 'Summary', below) is the greater average core and consequent blank dimensions in comparison to other Burqu' samples.

21.40	Alternating platform
19.93	Amorphous
21.65	Edge-of-orientation
13.40	Isoidal
20.08	On-flake
20.40	Opposed platform
9.71	Single platform
39.50	Fluted piece
<hr/>	
16.92	Average dimensions
Width	mm
Thickness	mm

Table 3.23 Burqu' 35000: core types

Blank variables

The distribution of butt types belonging to the sample of blanks measured for the Burqu' 35000 assemblage shows a pattern consistent with other Burqu' sites (Table 3.24). No punctiform or filliform butts characteristic of PPNB assemblages elsewhere were noted in the sample. Instead, the majority were unprepared cortical butts that reflect the dominant local raw material employed. Ventral characteristics such as the presence of a lip (27.0%) on the ventral butt edge and the large proportion of diffuse (33.0%) and flat (29.0%) bulbs suggest the possibility of the use of a softer hammer during core reduction, though the latter bulb type also reflects the considerable use of the bipolar-on-anvil technique in the assemblage. Though the average blank dimensions are, like the average core dimensions noted above, the longest of Burqu' samples, they are smaller than those of Dhuweila or Jebel Naja in terms of width and thickness, reflecting the size constraint presented by the local raw material.

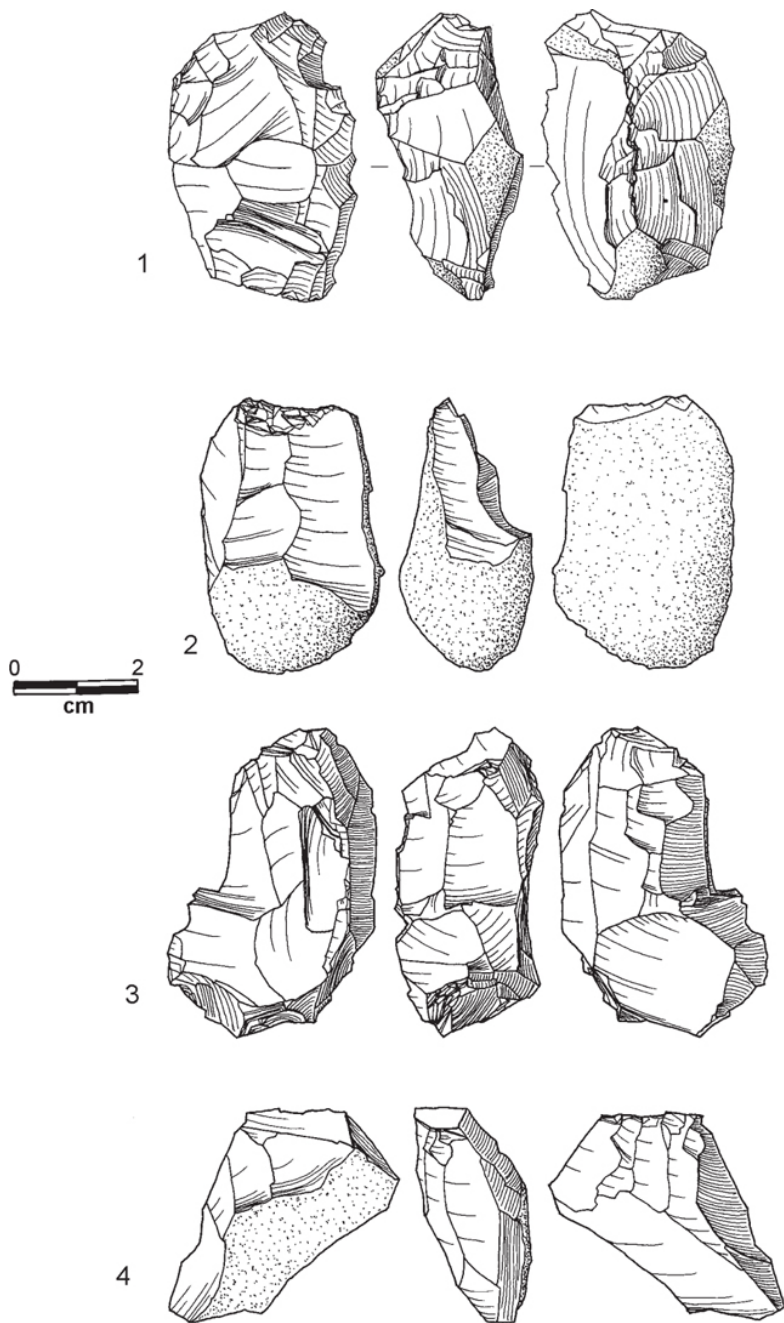


Figure 3.13 Burqu' 35000: chipped stone. 1. Opposed platform core; 2. Single platform core; 3. Mixed platform core; 4. Single platform core

Butt type
2000 pression
4400 x
3100 dral
2000 ed
2000
1000 plain
Butt blank dimensions
2100 mm
6180 ness
3100 width
3000 thickness

Table 3.24 Burqu' 35000: butt types

Scar pattern
5200 irectional
6000 x
0700 ed
0000 ial
6500 irectional

Table 3.25 Burqu' 35000: dorsal scar pattern

Tool type
1000 owhead
2010
3000 aper
0100 face
0175 knife
0000 er
0000
0000 iculate
0000 ch
0000 ication
0000 er
0000 ched piece
0000

Table 3.26 Burqu' 35000: major tool groups: absolute and relative counts

The distribution of the various dorsal scar patterns for the Burqu' 35000 assemblage is closest, like a number of other features noted above, to that of Burqu' 03000 (Table 3.25). The percentage of bidirectional scars is consistent with a somewhat greater percentage of opposed platform cores in the assemblage than at 03000, but also with the significant use of the bipolar-on-anvil technique. Like other assemblages in the Burqu' area, that of Burqu' 35000 is dominated by unidirectional flaking, a prominent feature of Late Neolithic assemblages in the Levant. This feature, like others describing the Burqu' 35000 core technology, shows an assemblage dated to the LPPNB/ELN/LN with a core technology that is more readily described as belonging to the Late Neolithic. Unidirectional core reduction could be related to the changes in technology shown at Jilat 13 and,

particularly, Jilat 25, which Baird (1993, 211, 281–2) described as being transitional between the PPNB and the Late Neolithic; but it is also likely to reflect the contingent features (dominated by raw material constraints) unique to the Burqu' area. The presence of a simple core technology in the Burqu' 35000 assemblage is consistent with the definition of the site as a 'burin site' dated to the LPPNB (see 'Tool typology', below). The early appearance of this assemblage type at Burqu' 35000 appears to agree with the early limited appearance of the 'burin site' phenomenon elsewhere in the arid zone (see Chapter 2; Baird 1993, 520–7; Rollefson and Fröhlich 1982) prior to its expansion during the Late Neolithic to include the sites of Jebel Naja and Burqu' 03000, considered in the present analysis.

<i>Tool type</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>++</i>
<i>Arrowhead</i>						
Amuq point	0	0	0	1	0	0
Badia point	0	0	0	0	0	1
Nizzanim point	0	0	2	4	2	3
Haparsa point	0	0	0	1	0	0
Broken	0	0	0	0	2	0
<i>Burin</i>						
On break	0	2	3	1	0	0
Truncation	0	3	26	12	3	15
Dihedral	0	0	0	1	1	0
Broken	0	0	7	2	1	1
<i>Scraper</i>						
Flake, various	0	0	1	1	0	0
Pebble flake	0	0	0	1	0	0
End on blade	0	3	7	2	2	1
End, other	0	0	2	2	2	2
Side	0	0	1	1	1	0
Tabular	0	0	1	0	0	0
<i>Biface</i>						
Foliate	0	0	1	0	0	1
Other	0	0	0	0	0	1
Tile knife						
Bifacial knife	0	0	1	0	0	1
<i>Borer</i>						
Borer on blade	0	1	1	1	0	0
Borer on flake	0	0	2	0	0	0
<i>Drill</i>						
Drill on spall	0	3	17	1	2	1
Other	0	0	0	2	0	0
<i>Denticulate</i>						
On blade	0	1	1	4	0	1
On flake	0	1	1	0	0	0
<i>Notch</i>						
On flake	0	0	1	1	0	0
On blade	0	0	0	0	0	1
<i>Truncation</i>						
On flake	0	0	5	1	0	0
On blade	0	0	3	0	0	2
<i>Other</i>						
Various	0	1	4	1	1	2
<i>Retouched piece</i>						
Blade	0	1	8	5	2	4
Bladelet	0	1	4	3	0	0
Flake	0	6	9	10	5	1
Pebble flake	0	0	2	1	0	0
Chip	0	3	2	2	3	0
Chunk	0	0	0	0	1	0
Miscellaneous	0	0	2	1	0	0
Total	0	26	114	62	28	38

Table 3.27 Burqu' 35000: tool types: absolute counts by phase

Tool typology

Site 35000 has a comparatively deep stratigraphy in comparison to the other Neolithic sites at Burqu', but unfortunately few tools were recovered from the lowest levels, which were reached only in the sondage. Tools from Phases 3 to 5 are fairly consistent in their typology and are comparable to the later levels of Site 03000 and the middle levels of Site 27000 (Tables 3.26 and 3.27; Figs 3.14–3.15). Relative proportions of tools are similar to those from Site 27000. Truncation burins are common, as are drills on spalls. Transverse arrowheads are absent; the dominant point form is the Nizzanim (Fig. 3.14, 6, 9). There are relatively low levels of truncated pieces, end scrapers on blades and elongated flakes, and limited use of pebble flakes: evidence from Sites 11000 and 02000 suggest that these forms start to increase in the later assemblages. The radiocarbon dates indicate an earlier period of occupation at Site 35000, within the LPPNB/ELN. Given that the sample of chipped stone was small, it is perhaps unsurprising that no examples of the rarer earlier arrowhead forms were recovered. Most of the tools are made on creamy white patinated flint which is not local to the immediate Burqu' area. A smaller number are of a rougher dark grey flint with a high proportion of cortex and probably represent use of the local surface pebbles. The assemblage also includes a small number of backed bladelets, lunates and one microburin, indicating traces of an earlier Natufian site in the immediate vicinity. All tools are relatively small in size, suggesting limited access to raw materials and correspondingly intense core reduction strategies.

Faunal remains

The animal bone assemblage from Burqu' 35000 consisted of a total of 2685 fragments, of which 66 were identifiable (2.5%). Table 3.28 gives the breakdown of identifiable versus non-identifiable fragments for separate contexts, showing that overall proportions of identifiable are very low (except for when there are very small samples per context), which is probably due to high bone fragmentation. The percentages of identified remains expressed as weights are generally higher than those expressed as counts, indicating that it is only the larger/heavier fragments that are diagnostic.

The identified specimens are shown in Table 3.29, expressed as NISPs for each phase of occupation. The assemblage is too small to calculate percentages of different taxa, but it is clear that gazelle bones dominate, with fewer sheep/goat, hare and equid bones.

Taxa and skeletal parts

Skeletal parts
Phase 1
There was no animal bone, not even unidentifiable material, from this phase
Phase 2 Trench 100
1 1 humerus shaft and 1 distal tibia fragment
1 proximal metatarsal and 1 proximal radius
1 1 proximal metatarsus, 1 radius and 1 ulna
1 coracoid
Phase 2 Trench 200
1 1 humerus, probably gazelle, but it is difficult to be certain as it is so young 1 gazelle-

sized lumbar vertebra

208 distal tibia

209 interesting that no sheep/goat bones were identified from this earlier phase, but the sample size of diagnostics is extremely small (n = 11)

Phase 3 Trench 100

~~100~~ tooth fragment

~~110~~ sheep/goat gazelle

~~110~~ sheep/goat-sized elements: 1 atlas fragment, 2 lumbar vertebra fragments and 1 proximal radius fragment

~~000~~ iliac fragment

~~910~~ fragments: 1 proximal radius, 1 fusing proximal femur, 1 fused second phalanx, 1 fused distal metapodial fragment, 3 further distal metapodial fragments (all unfused) and 2 mandible fragments, one of which shows extremely heavy wear on the M2 and M3

~~105~~ distal tibia fragment

~~110~~ pelvis acetabulum

~~110~~ elements: 1 humerus, 1 ulna

Phase 3 Trench 200

~~200~~ proximal radius fragment from a small equid

~~315~~ sheep/goat gazelle pal fragment

~~000~~ elements: 1 unfused proximal femur and 1 fused distal tibia

~~205~~ tragalus

~~000~~ ulna from a medium-sized bird

Phase 4 Trench 100

~~100~~ tooth fragment

~~110~~ sheep/goat gazelle tooth fragment

~~110~~ sheep/goat cuboid, 1 unfused distal tibia and 1 unfused distal humerus

~~007~~ elements: 1 mandible, 1 proximal radius, 2 first phalanges (one fused), 1 third phalanx, 3 petrous temporal bones, 1 pubis fragment, 1 fusing distal tibia, 1 unfused distal tibia, 2 distal metapodia and 1 gazelle-sized thoracic vertebra fragment

~~105~~ distal humerus, 1 maxilla fragment

Phase 4 Trench 200

~~110~~ sheep/goat and 1 tooth fragment

~~100~~ ulna

~~300~~ rabbits

Phase 5 Trench 200

~~000~~ distal phalanx

Phase	Context	Counts				Weights (g)			
		Non-IDs	IDs	Total nos	%ID	Non-IDs	IDs	Total weight	%ID
5	35101	30	0	30	0.0	12	0	12	0.0
4	35103	360	0	360	0.0	16	0	16	0.0
4	35104	32	1	33	3.0	55	7	62	11.3
4	35106	20	0	20	0.0	6	0	14	0.0
4	35107	1298	21	1319	1.6	675	28	703	4.0
3	35108	125	2	127	1.6	74	1	75	1.3
3	35109	41	0	41	0.0	14	0	14	0.0
3	35110	275	18	293	6.1	232	53	285	18.6
3	35111	4	0	4	0.0	2	0	2	0.0
2	35112	26	5	31	16.0	8	2	10	20.0
2	35114	27	2	29	7.0	8	1	9	11.1
2	35115	3	1	4	25.0	1	0.5	1.5	33.3

Phase	Context	Counts				Weights (g)			
		Non-IDs	IDs	Total numbers	%ID	Non-IDs	IDs	Total weight	%ID
5	35201	88	1	89	1.0	29	1.0	30.0	3.3
4	35202	150	6	156	3.8	71	8.0	79.0	10.1
3	35203	28	0	28	0.0	16	0.0	16.0	0.0
3	35204	52	4	56	7.1	67	3.0	70.0	4.3
3	35205	38	2	40	5.0	19	3.0	22.0	13.6
2	35206	7	0	7	0.0	3	0.0	3.0	0.0
2	35207	3	1	4	25.0	1	1.5	2.5	60.0
2	35208	4	1	5	20.0	2	9.0	11.0	81.8
2	35209	8	1	9	11.0	2	5.0	7.0	71.4

Table 3.28 Burqu' 35000: identifiable v. unidentifiable animal bones separated by context

Discussion

The bone from Site 35000 is not very well preserved (see Table 3.30), particularly in the upper phases (Phases 4 and 5). Its surface condition can only be described as fair or good for Phase 2 contexts, and the occasional Phase 3 context. Otherwise, condition is often poor, with surfaces etched away or described as battered. There has clearly been high fragmentation of the bone: fragments are often less than 50 mm in length, and normally are less than 30 mm long (Table 3.30). Surface weathering is quite variable, but often occurs in higher phases (4, 5, and 6).

	Phase						Total
	1	2	3	4	5	++	
Equid	0	0	2	1	0	0	3
Sheep/goat/gazelle	0	1	2	2	0	0	5
Sheep/goat	0	0	4	5	0	0	9
Gazelle	0	6	13	14	1	0	34
Hare	0	0	2	3	0	0	5
Medium bird	0	0	1	0	0	0	1
Small bird	0	4	2	3	0	0	9
Total	0	11	26	28	1	0	66

Table 3.29 Burqu' 35000: identifiable animal remains (NISPs per phase of occupation)

Phase	Context	Modal frag. size	Subjective preservation	Angularity	Colour						
					White	Fawn	Ginger	Mid- brown	Dark brown	Grey	Black
5	35101	10 to 30	Horrid	Sharp/spikey	x	x		x	x		
4	35103	0 to 10 (most) 10 to 30	Horrid	Battered/sharp/spikey		x			x		
4	35104	10 to 30	Poor	Battered		x			x		
4	35106	0 to 10 10 to 30	Mediocre Horrid	Battered		x			x		x
4	35107	10 to 30 50 to 70	Poor Surfaces often encrusted	Variable	x	x			x		x
3	35108	10 to 30 30 to 50	Poor Surfaces often encrusted	Battered/sharp/spikey	x	x			x		
3	35109	10 to 30	Poor/mediocre	Battered/sharp/spikey	x	x			x	x	
3	35110	10 to 30 50 to 70	Horrid Mediocre	Sharp/spikey	x	x			x	x	x
3	35111	10 to 30	Mediocre	Variable				x	x		x
2	35112	0 to 10 10 to 30	Mediocre Good	Sharp/spikey		x	x	x	x	x	
2	35114	10 to 30	Poor/mediocre	Variable		x			x		x
2	35115	0 to 10 10 to 30	Mediocre	Sharp/spikey		x			x		x
5	35201	10 to 30	Horrid/good	Sharp/spikey		x			x		
4	35202	10 to 30 30 to 50	Poor mediocre	Sharp/spikey	x	x		x	x		
3	35203	10 to 30	Poor mediocre	Sharp/spikey				x	x		
3	35204	10 to 30 50 to 70	Some good/mediocre Horrid. Poor	Sharp/spikey		x	x	x			x
3	35205	10 to 30 30 to 50	Mediocre	Variable		x		x			x
2	35206	10 to 30	Mediocre	Sharp/spikey	x			x	x		
2	35207	10 to 30 50 to 70	Fair	Sharp/spikey		x	x		x		x
2	35208	30 to 50	Good	Variable		x			x		
2	35209	10 to 30	Poor/good	Sharp/spikey		x	x				x

Table 3.30 Burqu' 35000: taphonomic information for contexts

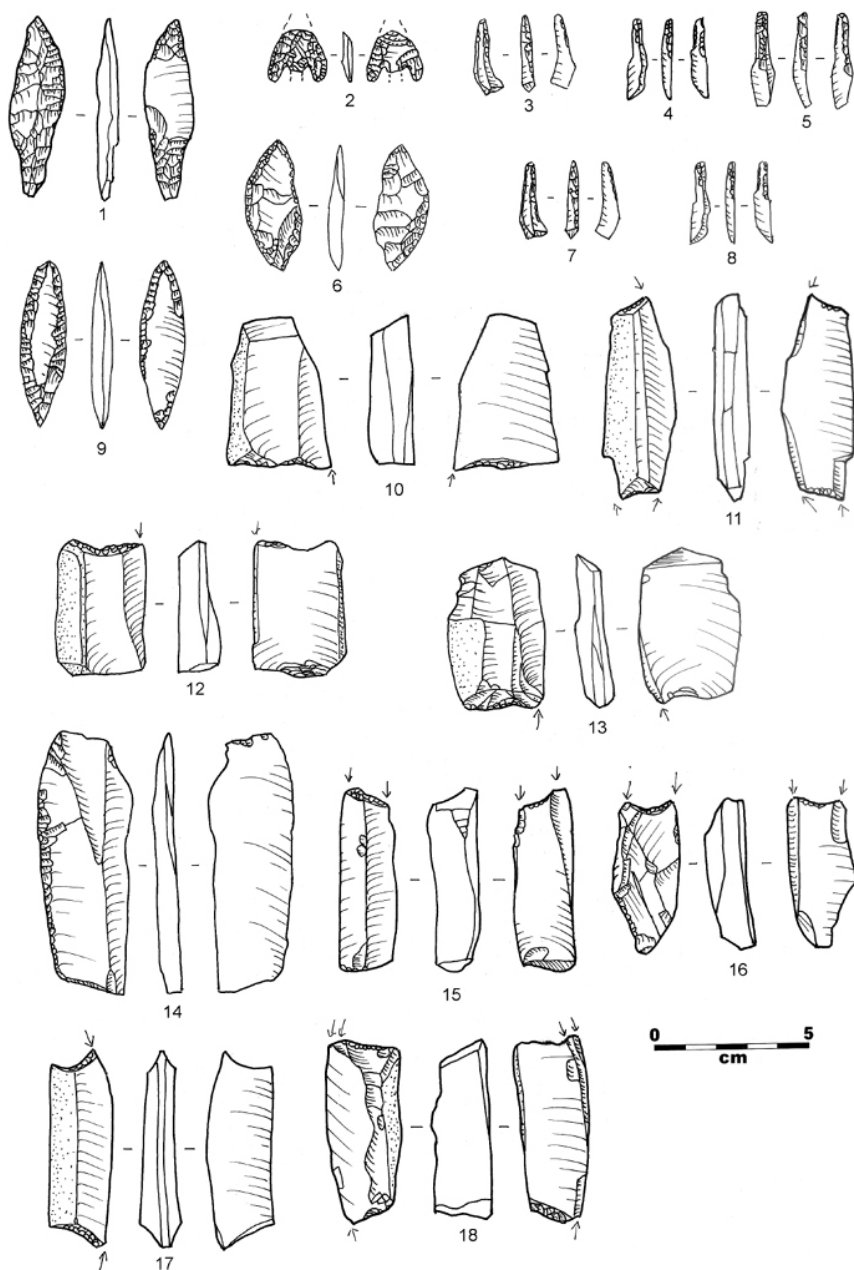


Figure 3.14 Burqu' 35000: chipped stone. 1. Amuq point; 2. Haparsa point; 3-5, 7-8. Drills on spalls; 6, 9. Nizzanim point; 10-13, 15-18. Concave truncation burins; 14. Retouched blade

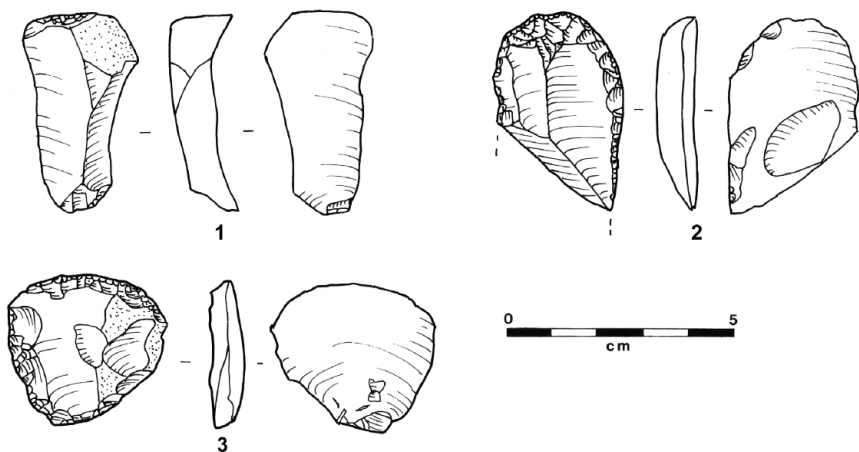


Figure 3.15 Burqu' 35000: chipped stone. 1. Pebble flake scaper; 2, 3. End scrapers

The colour descriptions indicate that much of the bone is burnt (*i.e.* black, grey or white), which is likely to have made it brittle and increased fragmentation. Curiously, there is no evidence of gnawing by carnivores, although poor surface conditions may have obscured such signatures. The condition of the material indicates that it may have been exposed for some time before burial, or that it was reworked; either way, it is likely to have undergone post-depositional taphonomic loss. The higher numbers of fragments (and identifiable) are in Phases 3 and 4, where there are hearths, pits and occupation deposits; in such circumstances burial may have been faster.

The dominance of gazelle and the presence of the (presumably) wild equids show hunting to have been practised by the occupants of Site 35000, along with trapping (of hare and small birds). The presence of caprines (sheep/goat) in Phases 3 and 4 is interesting, and considering the absence of caprines at LPPNB Dhuweila Phase 1 (Martin 1998, table 8.2 a, b) and the very limited evidence for wild caprines in the region (Martin 1998, 171 ff.), these remains may well represent herded domesticates. Unfortunately, the material is too fragmented to allow separation of sheep and goat, or for the taking of any measurements.

Summary

Site 35000 is the earliest site excavated at Burqu'. No structures were defined within the restricted excavation area; however, the rubble in and around the trenches suggested that the artefact scatter visible on the surface was associated in some way with structures similar to those at the other sites around the lake. The pits are consistent with evidence from other sites, but in this case were unusually rich in organic remains. The extensive number of hearths and pits within a restricted area is reminiscent of Stage 1 at Dhuweila, where it was apparently associated with activities relating to the processing of animal carcasses. At Site 35000, however, the fire-cracked stones present at Dhuweila 1 were absent and there were no clear indications of the uses for the pits and hearths. The dates

obtained from Phase 2 are consistent with those from Stage 1, the (Late) PPNB, at Dhuweila (see Table 1.2, above). Phases 3 and upwards are clearly later and associated with an ELN/LN occupation. The faunal remains are also consistent with the appearance of caprines by the Late Neolithic, although the absence of caprines in the earliest two levels could also be a function of the very limited amount of material recovered from the restricted soundings in these levels. The other unusual feature of Burqu' 35000 was the relative depth of occupation. This may be a function of its apparent length of (sporadic) use.

Site 27000

Site 27000 was selected for excavation because of its large size, apparently undisturbed structural remains and the abundant surface artefacts suggesting a Late Neolithic date. The site is located on a low rise on the eastern side of the lake at a point where the basalt spread of the *harra* thins out into the chert gravels of the *hamad*. The occupants had access to abundant building materials in the basalt and exposures of chert pebbles on the open plains for tool-making. As with the other sites around the lake, before excavation Site 27000 consisted of an oval mound of basalt rubble over 20 m in length in which some curving wall lines were visible. Prior to excavation a complete surface collection was made over the site and surrounding ground. All excavated deposits were sieved through 5-mm mesh and samples for flotation were taken from all layers below topsoil. Two trenches were laid out across the southern half of the mound (Trench 100, 2 m × 4.6 m; Trench 200, 3 m × 2.6 m). Excavation was focused on the south-east quadrant, where a distinct arc of upright stone slabs was visible close to the edge of the mound.

Excavation contexts, which were divided into 0.1-m spits, were defined arbitrarily, partially by the limits of structural features, as the site possessed very few distinct occupation deposits. Occupation debris consisted primarily of loose buff-coloured organic silt with varying amounts of windblown sand. In the centre of the site the sandy silt gave way here and there to an irregular compacted deposit with beetle casts broadly at the interface between Phases 2 and 3. A second distinct change was noted in the lower levels of Phase 2, where a darker, relatively sterile sandy deposit seemed to distinguish an exterior area of the structure. In contrast, a lighter, more compacted deposit containing a higher proportion of artefacts designated the interior at the same level.

Dating

Three radiocarbon dates were obtained for the site. These are for the earliest two phases and give a range within the late 7th millennium cal. BC. The two Phase 1 dates of 7930 ± 80 BP (6380–6040 cal. BC) OxA-2766 (27142) and 7350 ± 80 BP (6260–6000 cal. BC) OxA-2765 (27141) come from charcoal in pits cut into bedrock; the third date of 7270 ± 80 BP (6230–5950 cal. BC) OxA-2764 (27132) was obtained from charcoal which originated in an interior hearth assigned to Phase 2.

Stratigraphy

Phase 1

The earliest levels consisted of several small hearths and pits cut into bedrock and thin occupation deposits lying immediately above bedrock (Fig. 3.16). One pit, which was noticeably larger and filled with a rich organic deposit under a broad spread of black and grey ash, may have functioned as a storage feature. As well as the hearths, there was also a shallow pit, or midden; a series of three dark lenses of richly organic debris deposited within a long poorly defined trough cut into bedrock. There was no sign of burning within the midden and few associated artefacts. There was no evidence for structural remains in this phase, but any associated with it may have been under the unexcavated portion of the mound.

Phase 2

This phase saw the construction of a substantial, roughly circular stone structure completely covering the eroded bedrock surface and occupation levels of the previous phase (Fig. 3.17). It had a maximum internal diameter of 4.5 m, and no obvious entrance was found. Several large basalt boulders protruding from virgin soil were incorporated into its construction, their natural arc dictating the building's basic shape. Loose medium-sized stones were added to provide additional support to the foundation. Once the basic circular plan of the structure was established, the wall was completed with irregular rubble. Three features were associated with the structure: a small pit and two hearths. Associated occupation deposits were rich in chipped stone, bone and special finds. The chipped stone included both retouched pieces and debitage, suggesting that some production of tools took place on site. Most of the finds came from the interior of the structure.

A sub-phase of occupation during Phase 2 was marked by the presence of a fragmentary area of paving located in the eastern sector of the structure. The pavement was composed of irregular flat stones wedged in place with small pebbles. Additionally, a supporting terrace was constructed against the outer face of the wall. Like the wall, this was also built from large basalt boulders and filled in with irregular rubble. However, the arrangement of the boulders was different from that in the wall construction: the boulders were evenly spaced across the area of Trench 1 to the cairn edge, each being placed upright on a nest of small pebbles, with packing of loose irregular rubble and earth fill used between them to complete the terrace construction. From surface observations it was clear that the terrace encircled the whole cairn. Concentric parallel arcs in the terrace plan suggest that more than one phase of terrace construction took place during the occupation of the site.

Phase 3

In Phase 3 a second structure was built over the circular building of Phase 2 (Fig. 3.18). This new building was roughly ovoid in shape and orientated along a north-west/south-east axis. Parts of the earlier building were incorporated in its construction and the interior was sub-divided into two units. The construction techniques were varied, combining rough coursing with large squarish blocks of basalt. Southern parts of the wall had as many as three courses, while the central dividing wall was composed mainly of squarish blocks. Where the north end of the central wall abutted the exterior wall a large triangular block of basalt was placed

in pebble packing. The structure was extensively damaged by later occupation and the occupation levels associated with the structure were heavily disturbed.

Phase 4

The Phase 3 structure was partially demolished in this phase to create a foundation area for a small, centrally placed sub-circular cell (Fig. 3.19). The wall for this structure, an arc of upright basalt slabs, was placed against the interior of the wall of the earlier building, although the new structure extended well above the earlier rubble wall. The slabs were carefully selected to present flat surfaces to the interior and were set against the rubble wall with a row of smaller stones (which was later incorporated into an irregular pavement within the building) placed in front of them to provide stability. The exterior terrace no longer functioned as a supporting element in this phase, the upright arc being supported entirely by the earlier wall. In Phase 4, the terrace area became simply an exterior area where much of the artefact material was discarded. The interior pavement was made of thin irregular basalt slabs and flattish stones combined with pebble packing. At its south-east corner an unusual setting of stones – a crude arc of small stones placed around a small flat slab – seemed to be a deliberately constructed feature; its depth relative to the pavement suggests an attempt to create a shallow storage bin.

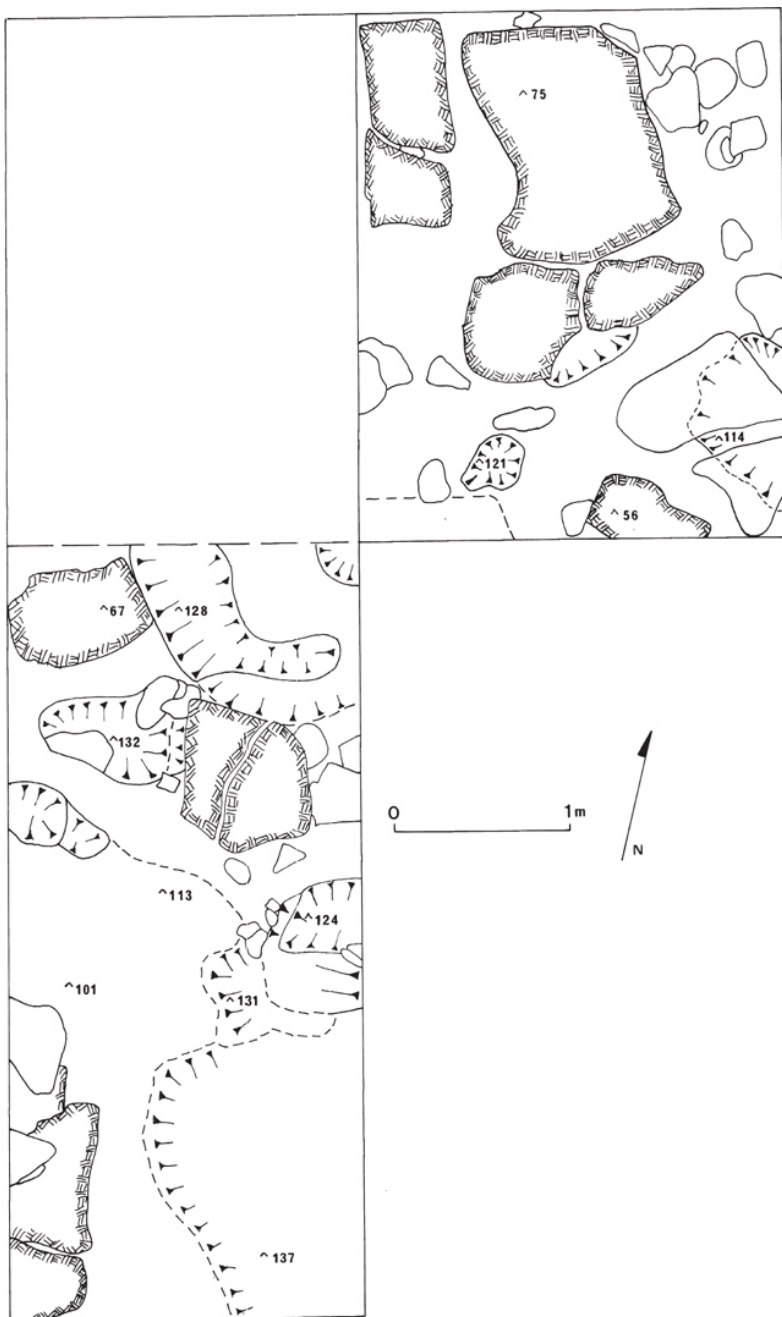


Figure 3.16 Burqu' 27000: plan – Phase 1

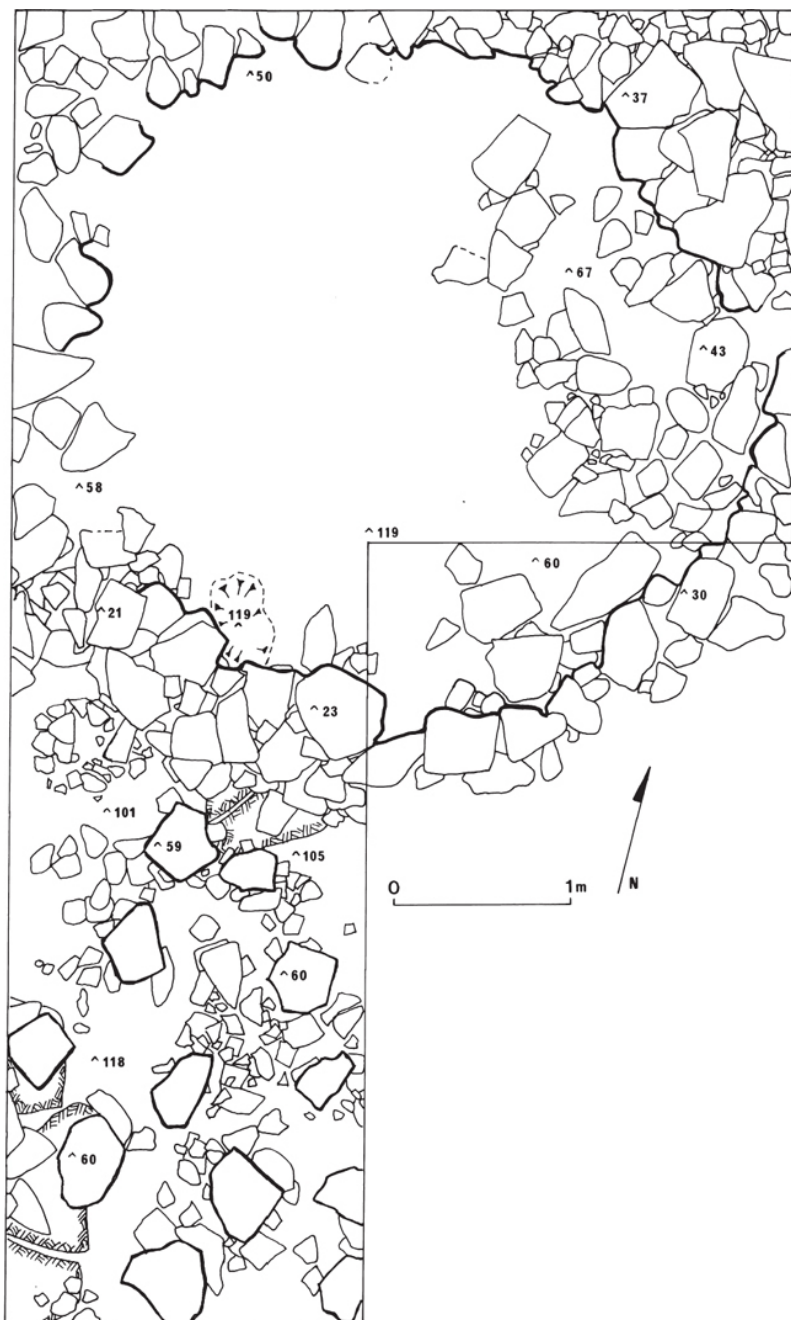


Figure 3.17 Burqu' 27000: plan – Phase 2



Figure 3.18 Burqu' 27000: plan – Phase 3

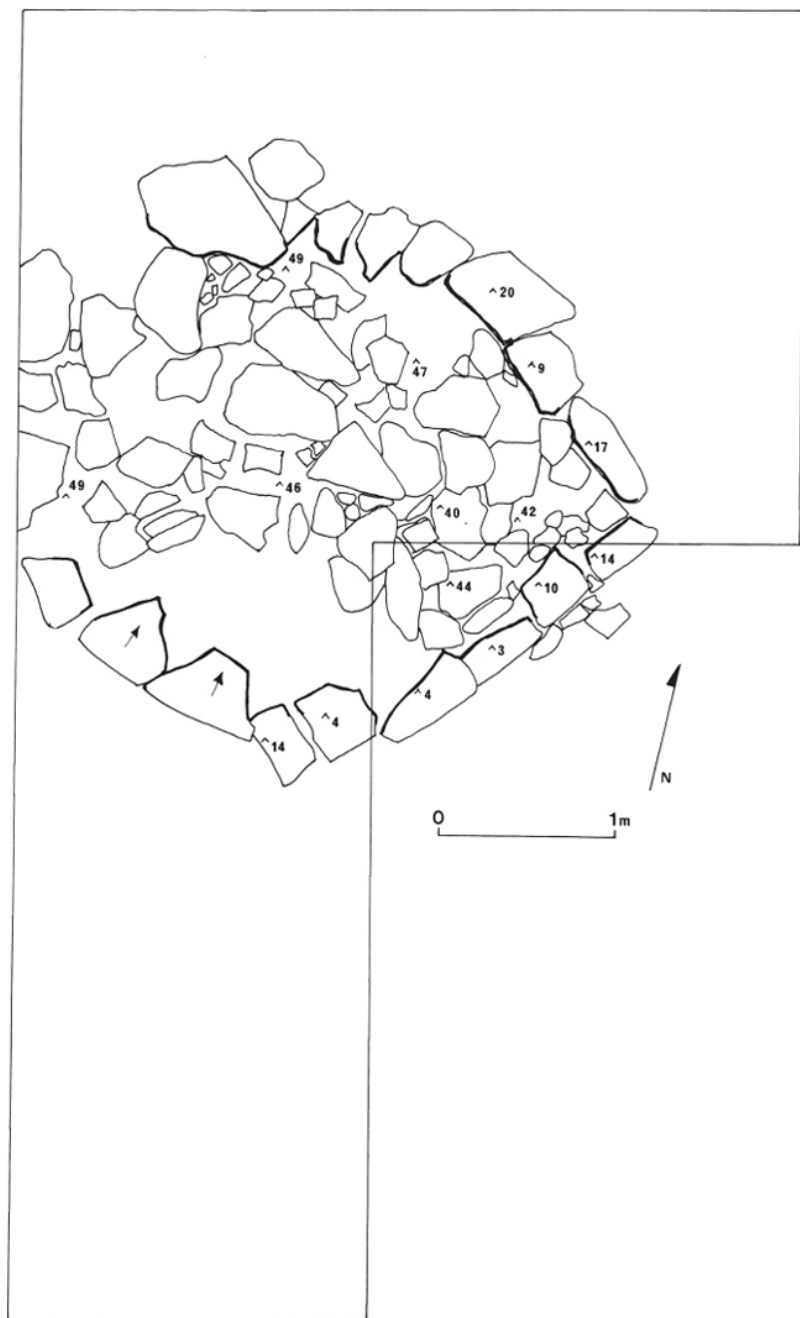


Figure 3.19 Burqu' 27000: plan – Phase 4

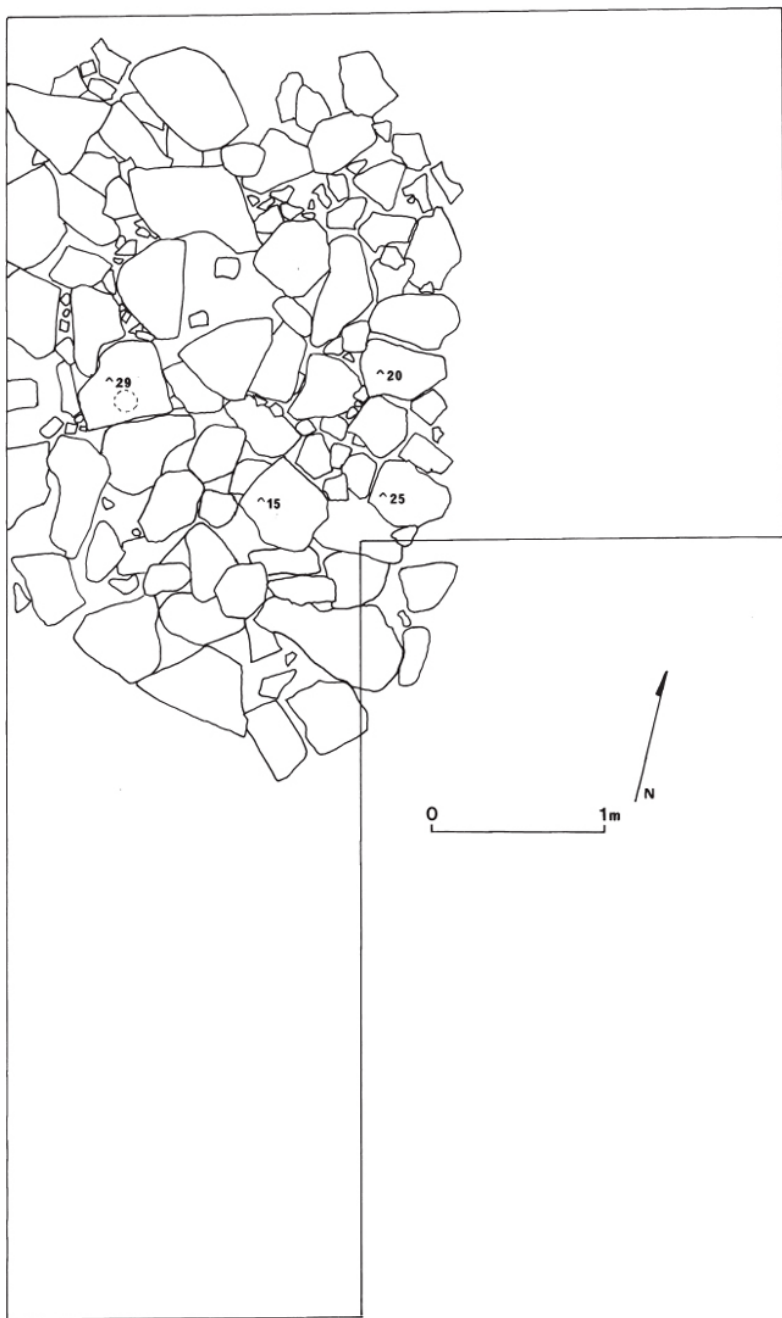


Figure 3.20 Burqu' 27000: plan - Phase 5

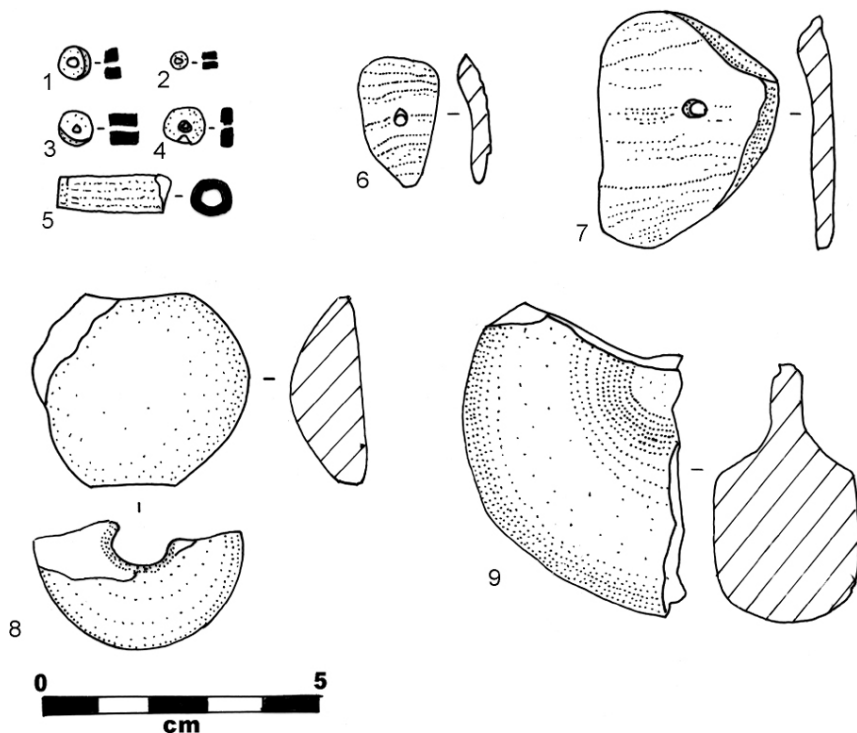


Figure 3.21 Burqu' 27000: special finds. 1. 105/4 stone bead; 2. 216/4 stone bead; 3. 220/4 stone bead; 4. 208/4 stone bead; 5. 231/2 dentalium shell bead; 6. 221/4 pierced mother of pearl; 7. 223/4 pierced mother of pearl; 8. 202/5 mace head fragment; 9. + + + worked sandstone (partially worked stone ring?)

Phase 5

The final phase of occupation at the site lay only a few centimetres below the surface. No walls were constructed during this phase, but a substantial pavement covered over much of the earlier structures (Fig. 3.20). The pavement had been partially damaged by post-Neolithic activities on the mound. A modern skull fragment indicated the use of the rubble mound as a recent grave disturbed by animal activity and weathering. Incorporated within the south-west side of the pavement was a large basalt quern with a small carefully formed depression a little off the centre of the stone. This artefact finds parallels with examples from Dhuweila, Ibn al-Ghazzi and Burqu' 03000 (see Burqu' 03000 above).

Phasing

- + + Unstratified surface collections and animal disturbance
- 5. Stone pavement, windblown sand and some recent disturbance
- 4. Small circular paved unit
- 3. Incomplete structure with two small oval cells
- 2. Circular structure with external terrace

1. Pits and hearths cut into bedrock
 For contexts by phase, see Table 3.31.

<i>Description</i>
<i>Phase ++</i>
100 Loose sandy topsoil and stones
101 101
201 101
<i>Phase 5</i>
202 Impacted sandy layer below 101
205 Impact sandy layer below 202
205 205
307 The pavement thinly covered by sandy layers of 201 and 202
Wall consisting of four upright slabs, possibly associated with 207
Wall of four large rocks, possibly associated with 210
<i>Phase 4</i>
Wall of upright slabs and drystone construction at SE end of trench
104 Interior stone terrace in south of trench
Wall of upright slabs abutting NE end of 103
105 above 104
109 of interior below 102
112 Interior fill below 109
115 Interior fill below 113
208 Interior fill below 207
209 Interior fill below 205
211 Interior fill
212 Interior fill among rubble collapse, soft brown sandy soil
213 Interior paving
215 below 208, above 213
216 Interior fill immediately below 213
217 Interior fill below 209
220 Interior fill below 216
221 Interior fill below 214
223 Interior fill below 217
224 Interior fill below 220
<i>Phase 3</i>
107 Interior fill in S of trench
108 Interior fill below 107
110 Interior fill below 108
Wall below 103 and associated tumble, partly robbed out for 103
117 Interior fill below 115
203 103
Wall abutting 103/204 to NW
218 Interior fill below 212
220 ble collapse in NW corner
225 Interior fill below 218
226 Interior rubble below 222
227 Interior fill at base of walls below 224
230 below collapse from 204
<i>Phase 2</i>
112 Interior fill below 110
Rubble wall below exterior collapse of 103

E16	terior fill below 112
E18	terior fill below 116
E19	terior fill below collapse from 103 and 114
I22	terior fill below 117
I24	terior fill below collapse from 103 and 114
F26	oundation trench for 103/114
I27	terior fill below 124
C28	mpact surface below 127
I29	terior fill below 127, abuts 128
I31	terior fill below 128
I32	terior fill below 129
I35	terior fill, abuts 131
I37	terior fill, abuts 132
E39	terior fill, abuts 126
E28	below 222
E29	ble abutting 203
E31	terior fill below 226
E32	terior surface below 227
E33	terior floor below 232
E34	terior fill below 233
E35	terior fill below 234
E36	terior fill around rubble
E40	terior fill, abuts 234
E41	terior fill below 231
E42	terior fill below 241
E43	terior fill below 241, abuts 242
E45	terior fill below 242

Phase 1

I20	rior occupation deposit/pit fill
I21	rior occupation deposit/pit fill
I23	rior fill below 120/121
I25	rior fill under 123
I33	rior hearth
I34	rior fill below 131
A35	y lense, interior below 135
I38	rior fill below 132
A40	y pit fill below 138
B41	ck ashy hearth below 132
B42	ck ashy fill abutting 141
B27	ck ashy fill below 235
E28	arth below 235
E39	around hearths below 235
E44	in bedrock
E46	terior fill below 245

Table 3.31 Burqu' 27000: contexts by phases

Special finds

Special finds from Burqu' 27000 include a number of stone beads, ground-stone tools, a fragment of a stone ring and several shells and pieces of worked mother-of-pearl (Table 3.32, Figs 3.21–3.23). Two coarse ware sherds were found in deposits of Phase 4 (Table 3.32), but their surfaces were heavily abraded and it was not possible to ascertain whether they were prehistoric or intrusive from later

occupation. A third sherd from Phase 4 and the eleven sherds collected from the surface were glazed and relate to use of the site in the Islamic period. A broken stone mace head was found in Phase 5 (Fig. 3.21, 8).

The beads are of three types. The most numerous were small white beads with a central perforation which were made from rounded pieces of chalk. The other beads were of similar forms to those found at Jebel Naja. The chalk beads were found in Phases 2–4, while the larger stone varieties occurred only from Phase 4 onwards. No Dabba marble or obsidian was found on Site 27000. The pierced shells and worked mother-of-pearl indicate contact with the Mediterranean or the Red Sea, although the mother-of-pearl could also have a freshwater origin. Shell types included dentalium and cowrie as well as mother-of-pearl. All three types were present in Phase 2, but from Phase 3 onwards only mother-of-pearl was found.

<i>Description</i>
2119 White bead
224 Facial ovate/planoconvex handstone, basalt
224 Facial ovate/flat handstone, basalt
224 Facial ovate/flat handstone, basalt
226 Facial ovate/planoconvex handstone, basalt
228 Mother-of-pearl, fragment
271 White bead
281 Dentalium shell bead
281 Quartz pebble
272 White bead
272 White bead
282 Mother-of-pearl, fragment
282 Mother-of-pearl, fragment
284 Dentalium shell bead
286 Facial ovate/flat handstone, basalt
240 Pierced shell
340 Spherical pounder, basalt
241 Facial ovate/flat handstone, basalt
308 Pierced bone
322 Pierced mother-of-pearl
327 Pierced mother-of-pearl
305 Fine bead
208 White stone bead
208 White bead
300 Broken mace head (fits with No. 2)
208 White stone bead
208 Earware body sherd
208 Earware body sherd
216 White bead
206 Earware body sherd
220 White stone bead
221 Pierced mother-of-pearl
223 Pierced mother-of-pearl
224 Pierced mother-of-pearl
302 White stone bead
302 Broken mace head
Broken basalt ring

Bifacial ovate/flat handstone, basalt
Stone ring fragment

Table 3.32 Burqu' 27000: special finds

Chipped stone

Raw materials

The core technology belonging to the assemblage of Burqu' 27000 is strongly influenced by the type of chert locally available to the Burqu' area. While there was some evidence for the use of better-quality white and grey chert during the first two phases of occupation at the site, the assemblage is dominated by brown and tan banded material that was used increasingly in the later phases (McCartney 1992, 50). In the discussion that follows the assemblage is considered as a whole for the purpose of comparison with other assemblages documented in this volume. For phase detail see the preliminary report (McCartney 1992).

	1	2	3	4	5	6
Cores	3.00	27.00	23.00	1.00	52.00	14.00
%	2.50	22.50	19.17	0.83	43.33	11.67
Blanks	8.00	12.00	30.00	4.00	39.00	7.00
%	8.00	12.00	30.00	4.00	39.00	7.00
Total	11.00	39.00	53.00	5.00	91.00	21.00
%	5.00	17.73	24.09	2.27	41.36	9.55

Table 3.33 Burqu' 27000: raw material quality

	Tabular	Cobble	Wadi- pebble	Patina	None
Cores	2.00	106.00	0.00	1.00	11.00
%	1.67	88.33	0.00	0.83	9.17
Blanks	11.00	68.00	0.00	3.00	18.00
%	11.00	68.00	0.00	3.00	18.00

Table 3.34 Burqu' 27000: cortex types

The raw material quality rankings attributed to the core and blank samples are illustrated in Table 3.33, which shows the assemblage to be slightly dominated by the utilization of relatively poor-quality chert types (5–6: 53.2%), a feature that is most consistent with the assemblage of Site 11000 (see below). The low frequency of butt deformation characteristics (8.0% crushing and 14.0% ring crack) is indicative of the use of moderate to poor materials, as was generally the case across the Burqu' area. A more limited presence of comparatively good-quality materials (Type 2) was more prevalent in the initial phases of occupation of the

site; its declining use thereafter may be related to shifts in the methods of core reduction employed (McCartney 1992, 50, see below).

Like all assemblages in the Burqu’ cluster, the Burqu’ 27000 assemblage is dominated by the use of cherts found in the form of weathered cobbles (Table 3.34). At Site 27000, the dependence on this locally available raw material was nearly absolute, with little use of non-local tabular cherts. This is particularly evident in the core samples, which are most indicative of the distribution of raw material exploited at the site. However, the numbers of artefacts struck on cherts exhibiting a heavy patina like those seen in the Burqu’ 35000, Burqu’ 03000 and Jebel Naja assemblages was vanishingly small, suggesting a system of raw material exploitation somewhat distinct from the other assemblages.

Artefact counts

The total sample from Burqu’ 27000 shows an assemblage dominated by knapping debris, but in which cores and core trimming elements as well as complete but unworked blanks represent more significant portions of the assemblage than shown for the assemblages of Burqu’ 35000, Burqu’ 03000 or Jebel Naja (Tables 3.35 and 3.36). This distribution remained effectively constant across the five phases of occupation at the site. The presence of fine debris and core trimming elements in the total distribution attests to the reduction of core materials on site here, as elsewhere. There are, however, few crested pieces which can be described as core preparation pieces, with most core trimming artefacts related to core maintenance practices. The clear dominance of completely cortical examples in all blank types, as well as the large number of cores and core fragments, suggests that individual cores did not produce large numbers of blanks. A low ratio of blanks to cores (2.9:1) agrees with this observation. Instead, the production of cortical blanks appears to have been an objective of the knapping strategy employed at the site, and one that appears to increase somewhat through time (McCartney 1992, 47–8).

N	
32287s	
99176	and core trimming elements
87716s	
3531s	
60001	

Table 3.35 Burqu’ 27000: total assemblage count

N	
30000	
33300	Blank
9641	Spall
3131e-1	
11025-2	
7143e-3	
0001e-1	
0447e-2	
0121e-3	
0120e-1	
0120e-1	

~~B56~~delet-2
~~B56~~delet-3
~~B56~~fragment
~~B57~~form rejuvenation
~~Bp1B~~ platform rejuvenation
~~B82~~sted
~~B00~~shot
~~C00~~ tablet
~~T563~~(all)
~~5600~~

Table 3.36 Burqu’ 27000: artefact types – core reduction

Blank type
B112
B112 /bladelet
S20
Tool blank type
B131
B168 /bladelet
B28
B30
B31

Table 3.37 Burqu’ 27000: blank type utilization

Core type
A244 platform
B560 (amorphous)
B238 edge-of-orientation
B36 oidal
C273 on-flake
Bp1 posed platform
B897 platform
S539 entered piece
Core dimensions
W130 mm
Thickness

Table 3.38 Burqu’ 27000: core types

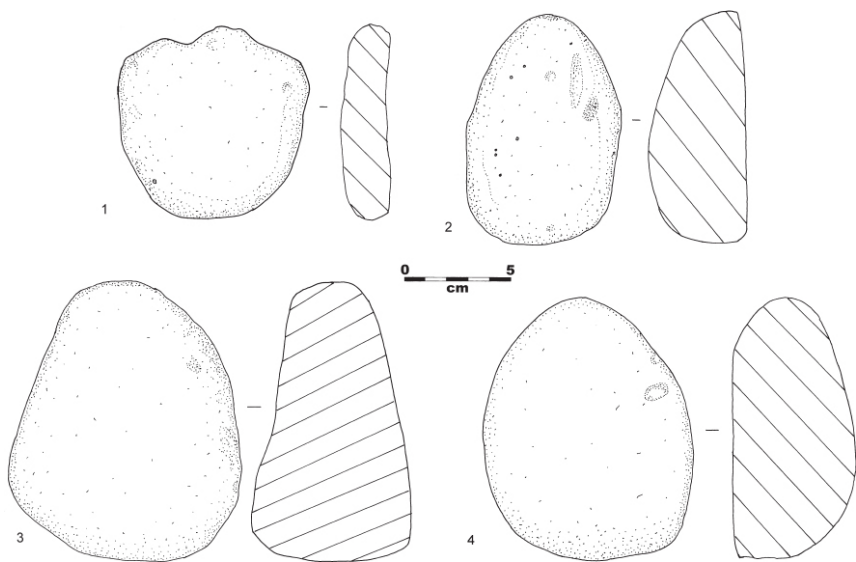


Figure 3.22 Burqu' 27000: ground stone. 1. 236/2 basalt bifacial ovate/flat handstone; 2. 124/2 basalt bifacial ovate/flat handstone; 3. 241/2 basalt bifacial ovate/flat handstone; 4. + + + basalt bifacial ovate/flat handstone

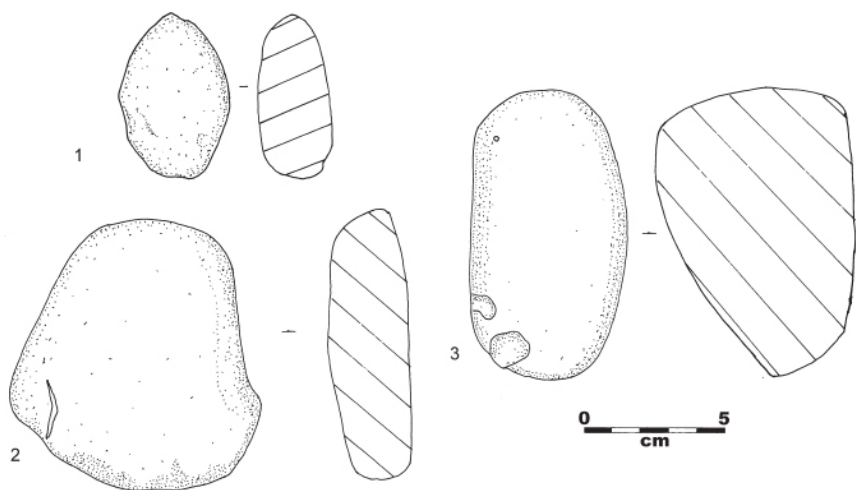


Figure 3.23 Burqu' 27000: ground stone. 1. 240/2 basalt sub-spherical pounder; 2. 124/2 basalt bifacial ovate/flat handstone; 3. 124/2 basalt unifacial ovate/flat handstone

The relative blank type percentages and the percentages of various blank types utilized for the production of tools (Table 3.37) shows a more heavily flake-based assemblage at Burqu' 27000 than those of Burqu' 35000, Burqu' 03000 or Jebel Naja, while both the manufacture and use of burin spalls are extremely rare in

contrast to those assemblages. Short irregular blades and blades do continue in use, but it is the heavier reliance on flakes that is the defining feature of this assemblage, linking it with those of Burqu' 11000, 20000 and 02000.

Core reduction methods

The distribution of core types shown in Table 3.38 illustrates a core reduction strategy that is most closely related to that of Burqu' 11000 (below), but shows greater resemblance to the assemblage from Burqu' 02000 in terms of the large number of cores-on-flakes utilized for the production of smaller flakes (Fig. 3.24). The analysis of core types across the five phases of occupation at Burqu' 27000 suggests a shift in core reduction methods over time. Opposed platform examples give way to greater percentages of change-of-orientation cores, and greater percentages of simple alternating platform cores appear to replace more formal discoidal examples. Amorphous cores decrease most significantly through time, possibly to be replaced by greater numbers of cores-on-flakes (McCartney 1992, 49–50). Taken together with an increase in the numbers of cores assigned to each phase, these shifts in core reduction methodology imply that an increasingly expedient character defined the assemblage. Corresponding to the lower percentage of blade/bladelets shown in Table 3.37, the percentage of cores exhibiting negative blade/bladelet scars is also comparatively low (37.5%) in comparison with the assemblages of Burqu' 35000, Burqu' 03000 or Jebel Naja, and closer instead to the assemblage of Burqu' 11000. The average core dimensions of Burqu' 27000 again parallel those of Burqu' 11000, as does the percentage of cores that can be labelled exhausted (44.2%). The comparatively low percentage of cores exhausted for reasons of size (35.0%) is consistent with the suggestion that cores were not heavily reduced at Burqu' 27000. Cores exhibiting other attributes of exhaustion were discarded – owing to excessive stepping (24.8%), overly obtuse striking platforms (4.2%) and raw material problems (8.3%).

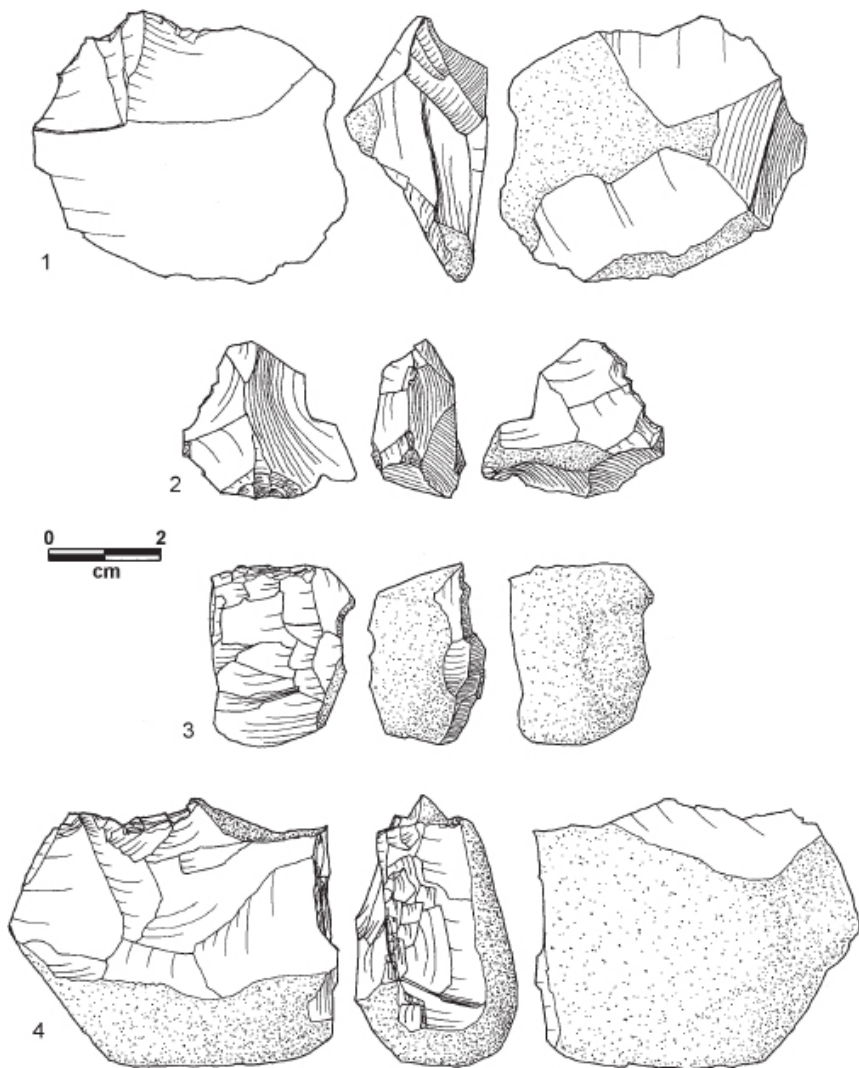


Figure 3.24 Burqu' 27000: chipped stone. 1. Core on flake; 2. Discoidal core; 3. Single platform core; 4. Crossed platform core

Blank variables

The butt types documented in Table 3.39 represent a sample of 100 blanks rather than the total samples of blanks examined by McCartney (1992, fig. 19). Butt types somewhat different from those used in this previous publication were utilized in the present analysis in order to generate data comparable with the rest of the Burqu' material. General trends are, however, the same in both analyses. Cortical butts are dominant, followed by the plain and then faceted butt types. The percentages of the various butt types for Burqu' 27000 are broadly equivalent to

those for the other Burqu’ assemblages. Like other Burqu’ assemblages, the majority of the ventral bulbs are salient (49.0%), with fewer diffuse examples (33.0%) or examples with flat ventral faces (18.0%) demonstrating the use of the bipolar-on-anvil technique. This variable suggests the use of harder hammers during percussion, particularly considering the dampening affect that the cortex on the striking platform has on the development of salient bulbs. Average blank dimensions show flakes that are consistent with those of other Burqu’ cluster sites. They are shorter and narrower than the robust examples found at Jebel Naja, but not as fine as the Dhuweila Late Neolithic examples.

Butt type
40.0% compression
42.0% x
31.0% dorsal
19.0% ed
18.0%
14.0% plain
Blank blank dimensions
22.0 mm
7.86 mm
11.94 mm
1.18 thickness

Table 3.39 Burqu’ 27000: butt types

The blank sample measured for the Burqu’ 27000 assemblage is heavily dominated by the presence of unidirectional dorsal scars, as elsewhere in the Burqu’ area (Table 3.40). The sample also shows a lower percentage of bidirectional scars than at both Burqu’ 03000 and Burqu’ 35000 and a higher percentage of fully cortically dorsal surfaces, which appears technically consistent with other elements of the core technology belonging to Burqu’ 27000, suggesting a less intensive degree of reduction for individual cores.

Tool typology

The tools indicate a sequence, either continuous or interrupted, from the PPN/ELN transition through into the developed Late Neolithic (Figs 3.25–3.27). The assemblage is typical of the Burqu’ Neolithic, with some variations from the other sites in proportions of tools within the assemblage (Tables 3.41–3.42). The most common tool type is the burin, at 16.0%. Arrowheads make up roughly 8.0% of the assemblage, while scrapers are relatively common at 13.0%.

The earliest type of arrowhead is the Badia point. Points of this type occur in Early Late Neolithic levels at Jilat 13 together with Byblos, Amuq, Haparsa and Herzliyah points, but not transverse arrowheads (D. Baird, pers. comm.). They also occur at Dhuweila, predominantly in Late Neolithic levels (Betts *et al.* 1998, 101, 96, fig. 4.14). They appear to be similar, if not identical, to points from Late Neolithic Um Dabaghiyah in the Syrian Jezireh (Mortensen 1983). The arrowheads from Burqu’ 27000, while typologically similar, are smaller and thinner. Nizzanim and Herzliyah points (Fig. 3.25, 6–10) occur in Phase 2 together with transverse

<i>Tool type</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>++</i>
<i>Arrowhead</i>						
Amuq point	0	0	0	1	0	0
Badia point	3	2	0	0	0	0
Nizzanim point	0	4	0	0	0	0
Herzeliya point	0	1	0	0	0	1
Transverse	0	5	2	0	0	4
Other	0	1	0	0	0	0
Broken	0	2	0	1	0	1
<i>Burin</i>						
On break	3	8	4	4	0	2
Truncation	2	10	0	4	2	8
Dihedral	0	4	0	0	0	0
Nucleiform	0	1	0	0	0	0
Multiple mixed	0	0	0	0	0	1
Broken	0	5	0	0	0	0
<i>Scraper</i>						
Flake, various	0	11	0	4	0	4
Pebble flake	0	3	3	2	1	8
End on blade	0	0	1	0	0	1
Tabular	0	1	1	4	0	1
<i>Biface</i>						
Foliate	0	0	0	1	0	2
Axe/adze	2	0	0	0	0	0
Other	0	0	1	0	0	0
<i>Tile knife</i>						
Bifacial knife	0	1	0	0	0	0
<i>Borer</i>						
Borer on blade	0	3	1	1	0	2
Borer on flake	1	7	0	2	2	6
<i>Drill</i>						
Drill on spall	1	1	0	0	0	0
<i>Notch</i>						
On flake	0	1	0	0	0	0
On blade	0	1	0	0	0	0
<i>Truncation</i>						
On flake	1	6	0	2	1	14
On blade	0	0	1	1	0	0
On pebble flake	0	0	1	1	1	2
On chip	0	1	0	0	0	0
<i>Chopper</i>						
Chopper	0	3	0	1	0	0
<i>Retouched piece</i>						
Flake	0	30	7	10	4	2
Blade	1	10	3	2	2	2
Pebble flake	2	8	1	4	5	9
Misc.	0	2	0	0	0	0
Broken	1	13	9	5	5	7
Total	17	145	35	50	23	77

Table 3.42 Burqu' 27000: tool types: absolute counts by phase

Most of the scrapers are irregularly retouched flakes. There are two end scrapers on blades, a form which occurs more commonly at other Burqu' Neolithic sites. Scrapers on pebble flakes are present from Phase 2 onwards but form a more significant proportion of the tool totals in Phases 3–5. Scrapers on thin, flat cortical flakes are found from Phase 1 onwards, but are most frequent in Phase 4. One example from Phase 4 has preserved a faceted platform, perhaps suggesting a date in the later Late Neolithic or Chalcolithic period. A tabular scraper with faceted platform was also found at al-Hibr.

Tools in the bifacial class in Phase 1 are rough versions of the axe/adze tools found on Late Neolithic sites in the verdant regions. Similar crudely worked pieces occur infrequently on 'burin Neolithic' sites. The tabular knife from Phase 2 is a type found in the Late Neolithic stage at Dhuweila (Betts *et al.* 1998, 110–12, figs 4.27–4.29) and has parallels in Late Neolithic contexts on sites in the Middle Euphrates region at Tell Sabi Abyad in the Balikh Valley and at Baghouz near Abu Kemal (ancient Mari) (Copeland 1989). Crude foliate bifacial tools occur on 'burin Neolithic' sites (see Chapter 2 above). In the Negev a defining feature of the Tuwailan (Goring Morris *et al.* 1994) is the presence of cortical knives in association with Byblos and Nizzanim arrowhead forms.

Drill bits on spalls, associated elsewhere with the Late Neolithic, occur only in the lowest levels of Phases 1 and 2. Roughly formed borers of various kinds occur throughout. Only two irregular notched pieces were recovered, these coming from stratified contexts in Phase 2. A small number of heavily battered chunks were classified as choppers. Miscellaneous retouched pieces form a high proportion of the assemblage. Most are on small or medium-sized flakes, but worked and used blades are also present. Part of this category consists of broken pieces which may represent fractured, and thus unidentifiable, tools.

The presence of Badia points in the earliest levels suggests that occupation began early in the Late Neolithic or around the time of the PPN/ELN transition. Late Neolithic point forms disappear entirely in the later levels, leaving only transverse arrowheads. Elsewhere, these are found on Late Neolithic sites but continue on, without other forms, into the Chalcolithic (Rosen 1997, 39 ff.). They are the only projectile form in the al-Hibr assemblage (see Chapter 5). The more diagnostic tools indicate that the main occupation dates to the Late Neolithic period, but it is possible that the upper levels represent the later end of the Late Neolithic, possibly even into the early Chalcolithic period.

Proportions of different tool types in the assemblage are consistent with the limited environmental data to hand. Arrowheads in modest proportions indicate that hunting played a role in the economy; agricultural and wood-working tools are, not unexpectedly, virtually absent; and the majority of the tool kit is made up of tools which occur consistently on hunter/herder sites elsewhere in the steppe.

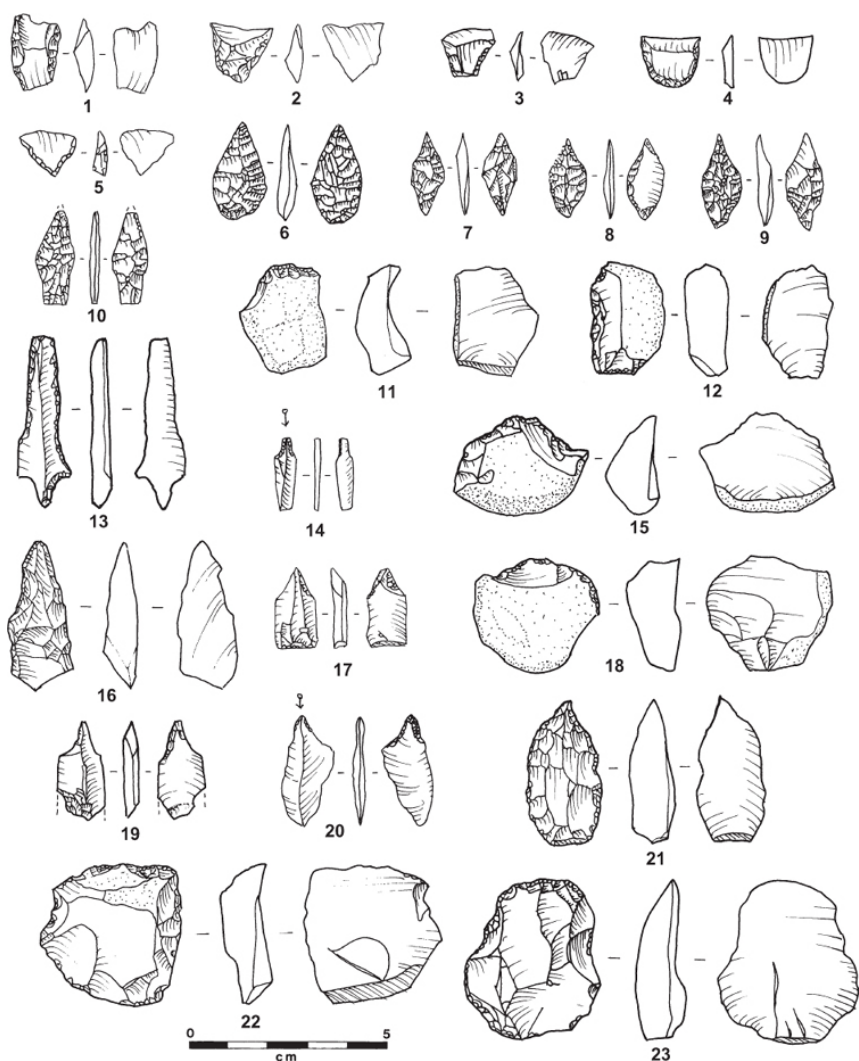


Figure 3.25 Burqu' 27000: chipped stone. 1–5. Transverse arrowheads; 6–9. Nizzanim points; 10. Herzeliya point; 11, 12, 15, 18, 22. Pebble flake scrapers; 13. Arrowhead; 14. Drill on span; 16. Borer on flake; 17, 19, 20, 21. Borer on blade; 23. Flake scraper

Phase	Counts				Weights (g)			
	Non-IDs	IDs	Total nos	%ID	Non-IDs	IDs	Total weight	%ID
1	120	5	125	4.0	150	80	230	35
2	3038	168	3206	5.2	3178	1173	4351	27
3	498	37	535	6.9	292	116	408	28
4	1178	45	1223	3.7	509	167	676	25
5	56	5	61	8.2	29	6	35	17

Table 3.43 Burqu' 27000: identifiable v. unidentifiable animal bones by phase

Faunal remains

The faunal assemblage from Burqu' 27000 consisted of 4927 fragments, of which 260 were identifiable (5.3%). Table 3.43 presents the counts and weights of the identifiable versus the unidentifiable fraction for each of the five phases of occupation, and shows that the percentage of identifiables in each phase is (often far) less than 10.0%, probably because high fragmentation makes specimen identification difficult.

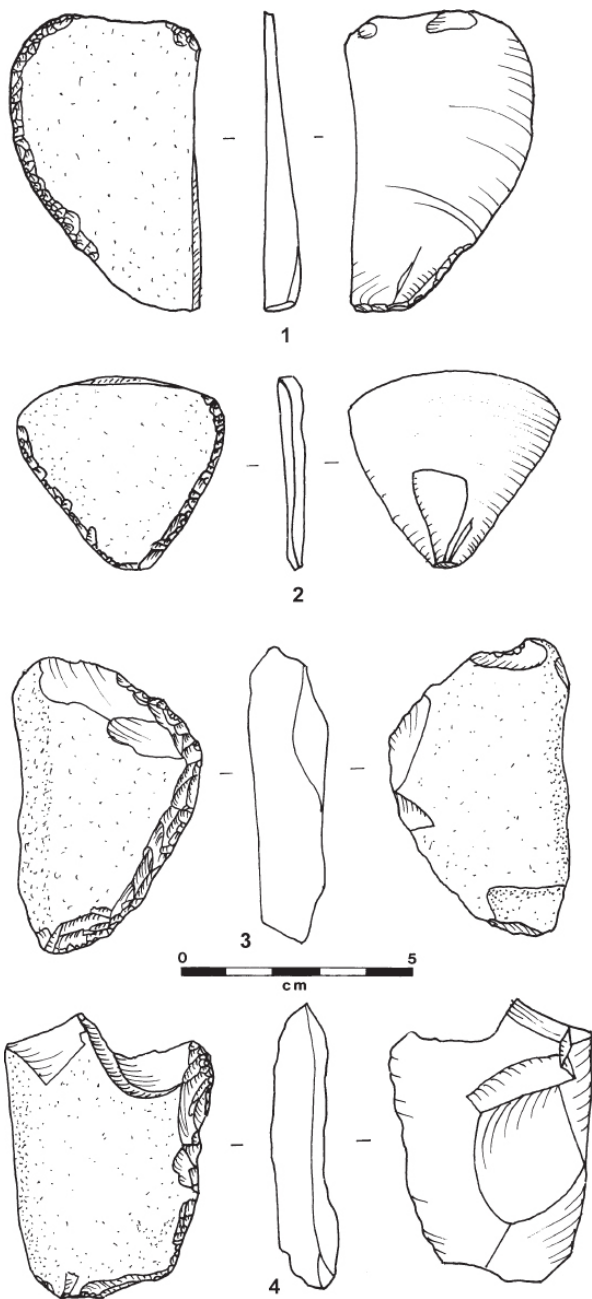


Figure 3.26 Burqu' 27000: chipped stone. 1–4. Tabular scrapers

	<i>Phase</i>					<i>Total</i>
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	
Equid	4	18	0	2	0	24
Sheep/goat/gazelle	0	30	19	6	1	56
Sheep/goat	1	78	4	13	0	96
Sheep	0	7	2	4	0	13
Goat	0	1	0	0	0	1
Gazelle	0	17	0	1	0	18
Dog/wolf	0	4	1	1	0	6
Fox	0	0	0	1	0	1
Hare	0	12	11	15	4	42
Hedgehog	0	1	0	1	0	2
Mustelid	0	0	0	1	0	1
Total	5	168	37	45	5	260

Table 3.44 Burqu' 27000: identifiable animal remains (NISPs per phase of occupation)

Table 3.44 shows the NISP counts of the identified specimens for each phase. Sample sizes are unequal across phases, making it impossible to explore variation through time. Considering the totals for the site, while there are some carnivores and mustelids represented, it is clear that 96.0% of the identified fragments are identifiable to four taxon groups: sheep/goats (42.0%), hare (16.0%), equids (9.0%) and gazelle (7.0%) (the sheep/goat/gazelle group accounts for 22.0%). Caprines, therefore, dominate the assemblage, and will be discussed further below.

Equid parts
Phase1200
Equid fragments
Equid tibia fragment
Phase2100
Equid phalanx, one maxilla with teeth
11 mandible tooth
11 proximal metacarpal, 1 distal metapodial, 2 first phalanges,
12 horn core
12 proximal ulna
12 distal tibia
13 mandible tooth
13 segment of horn core
12 horn core
11 equid phalanx
11 equid/gazelle proximal tibia
11 distal humerus
12 distal femur
12 distal metapodial
12 mi lunaire, 1 maxilla with teeth, 1 maxilla tooth
12 distal tibia

138mandible tooth
112proximal metapodial
119calcaneum, 1 proximal radius
124proximal metapodial,
128stalar humerus, 1 calcaneum
137mandible tooth

Trench 200

110proximal metapodial
231mandible condyle, 1 scapula, 1 calcaneum, 2 mandibles with teeth
232pyramidal, 1 semi lunaire,
233aphoid, 1 third phalanx, 1 maxilla with teeth, one tooth fragment
234las, 1 distal tibia, 1 distal metacarpal
235na fragment, 1 mandible condyle, 2 first phalanges
241capula, 1 distal tibia, 1 proximal metacarpal, 2 proximal metatarsals, 1 distal metacarpal, 1 distal metapodial, 1 distal metatarsal
242mandible condyles, 1 proximal ulna, 1 proximal femur, 1 proximal metacarpal, 3 first
243proximal femur, 1 proximal metacarpal
245proximal metacarpal, 1 calcaneum, 1 distal femur, 1 os chrochum, 2 maxilla teeth, 1 mandible with teeth
246capula, 1 proximal metapodial
231distal metapodial
234elvis
236proximal radius
110distal metacarpal
231third phalanx, 1 scapula
234stalar humerus, 1 third phalanx
241distal humerus
110distal humeri
241distal metatarsal
241ulna, 1 maxilla tooth, 2 mandible tooth fragments, 1 tooth fragment
238mandible tooth
234colla fragments
235oth fragment
241elvis, 1 distal radius, 1 distal tibia, 4 first phalanx, 1 mandible tooth
242na, 1 proximal radius, 1 cap trapezoid
243cond phalanx
245mandible tooth
241proximal metapodial, 1 second phalanx
242apula
241mandible with teeth
242mandible with teeth

Phase 3100

110distal metacarpal
110cap/frag/radius fragment, 1 mandible fragment
108na, 2 horncore fragments, 2 maxilla fragments
110las fragment

Trench 200

110capula
110proximal femur
227arpal (capetum-trapezoid), 1 carpal (os chrochum)
230stalar tibia
110distal tibia fragment
226tragalus fragment
227capula fragment, 1 metacarpal fragment, 1 pevis fragment, 1 capetum-trapezoid

fragment

230 capula fragment, 1 trapezoid fragment, 1 third phalanx

Mandible fragments

226 distal humerus

227biae

230elves, 1 tibia, 1 scapula

Amistapodial

Phase 4100

\$H^0_{\text{cusp}}/g_{\text{cusp}}\$

Shelvig foragmøtelle

Trench 200

2nd phalanx, 2 distal tibia fragments

224 Third phalanx

3167, 1 distal metapodial

217 Mandible with teeth

220 distal humerus, 1 naviculo-cuboid, 1 distal metapodial

223 pal (semi-lunaire)

224 distal femur, 1 distal tibia, 1 malleolus, 1 calcaneum, 1 second phalanx

Shapinggazelle

220 bird phalanges, 1 second phalanx

2.2.2 Distal radius fragment

22 Proximal metacarpal fragment, 1 proximal metatarsal fragment

224 pelvis fragment

Encephalanx

Equatorial radius fragment

215 Proximal ulna fragment

Elasmobranchia, 1 metapodial, 1 first phalanx

215 First phalanx, 1 distal femur

21 distal humerus, 1 ulna shaft, 1 proximal metapodial fragment, 1 distal metapodial fragment, 1 first phalanx, 1 mandible fragment

220 radius, 1 carpal/tarsal

224 *calcanea*

Edmandible

~~E20~~ispal/tarsal

Muscula fragment

Eligibility

Phase 5100

Sheep/goat/giraffe meat

Elasmobranchs, 1 tibia

Trench 200

~~Plant~~ phalange

Body part patterning

For sheep and goats, all body parts appear to be present. This indicates no selective transport of carcass parts either to or from the site, suggesting that carcasses were being processed and probably consumed *in situ*. The sample for gazelle is too small to detect skeletal part patterning, while there is a scatter of equid long bone fragments, but they are primarily represented by tooth fragments. A full range of hare elements (skull, limb bones and feet) is present.

Sheep/goat

Where separable through morphological criteria, sheep far outnumber goats at Burqu' 27000 (at a ratio of 13:1). It has been argued elsewhere (see Site 03000, 'Faunal remains', above), primarily on the basis of zoogeographic evidence, that the caprines are likely to represent introduced domesticates rather than hunted wild stock (although the fragmentary remains do not provide metrical data which might support this).

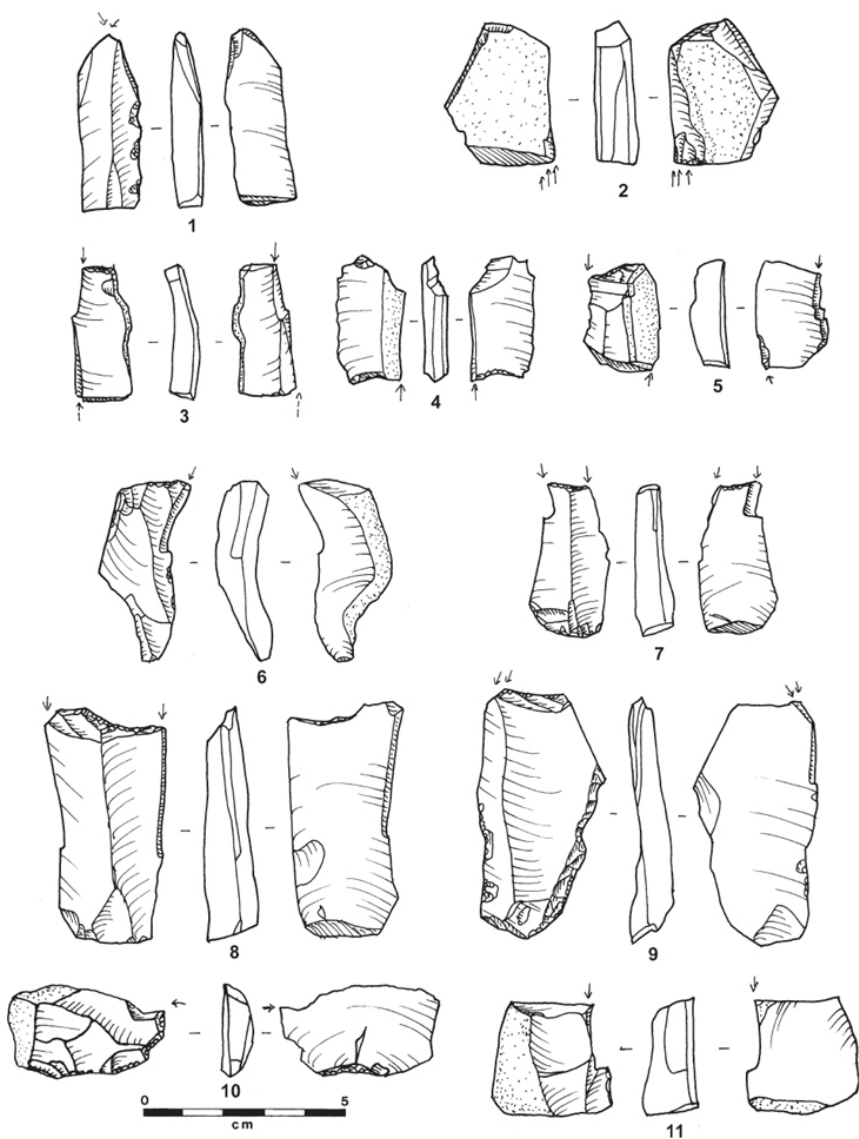


Figure 3.27 Burqu' 27000: chipped stone. 1. Dihedral burin; 2. Multiple burin on break; 3–10. Truncation burins; 11. Burin on break

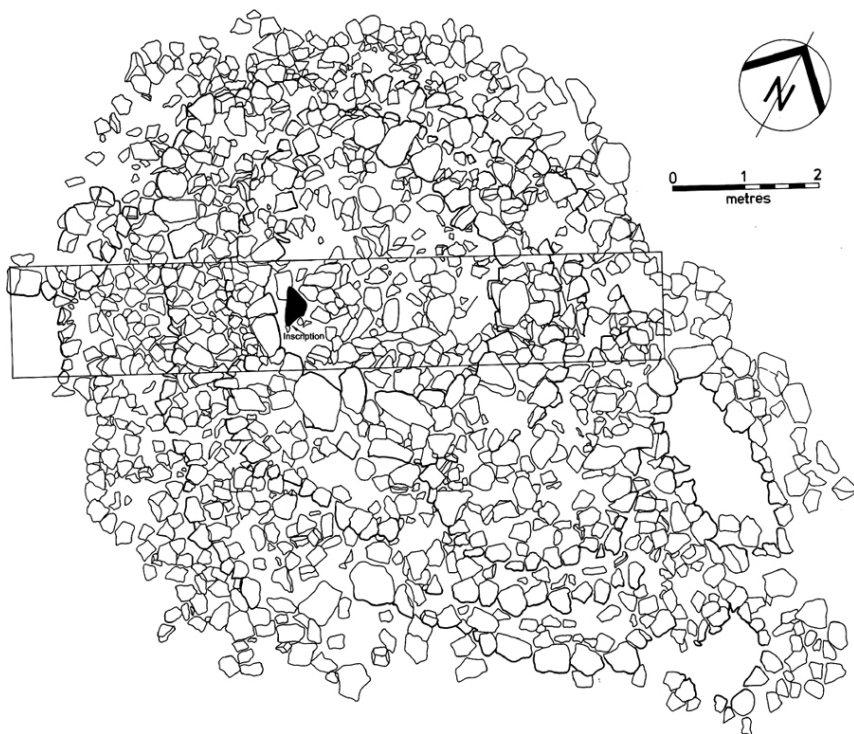


Figure 3.28 Burqu' 11000: pre-excavation plan

The sample provides too few ageing data for a detailed exploration of cull patterns. However, the presence of four unfused sheep/goat bones and five fused bones in the 18- to 28-month fusion range (following Silver 1969, 285–6), and three unfused and no fused specimens in the 30- to 42-month fusion range, hints at animals being culled before full adulthood. Three mandibles (each with some missing teeth) showed light to moderate wear on their permanent molars and one mandible showed deciduous dentition, supporting the picture of younger animals being culled for their meat and fat products.

Discussion

The assemblage was generally quite heavily encrusted with a deposit which could not be removed by washing (and more abrasive cleaning techniques were avoided so as not to interfere with bone surface modifications), so some bone observations/identifications may have been obscured. However, 12 bone fragments were observed as having pitting characteristic of carnivore gnawing. Four further fragments appear to have been digested by carnivores. Hence, in contrast to that of Burqu' 35000, the assemblage shows clear carnivore activity which may have resulted in some bone loss.

There is very little burning across the assemblage. Only one context, 237 from Phase 1, which contains pits and hearths cut into bedrock, has burnt bone.

Otherwise, the material was a fairly homogenously ginger/brown, contrasting with the more varied Burqu' 35000 material.

In terms of the composition of the faunal assemblage, Burqu' 27000 also contrasts with Burqu' 35000 in that caprines are dominant while gazelle makes up a relatively small percentage of the total. Burqu' 27000 might be interpreted primarily as a herding encampment, but there is a significant presence of hunted fauna (equids and gazelle) and hunted/trapped prey (hare) in the assemblage, as well as the dog/wolf, which could be either a tame hunting/herding companion or a wild catch. In sum, the animal bone assemblage appears to have been produced by multiple procurement strategies which defy simple categorization.

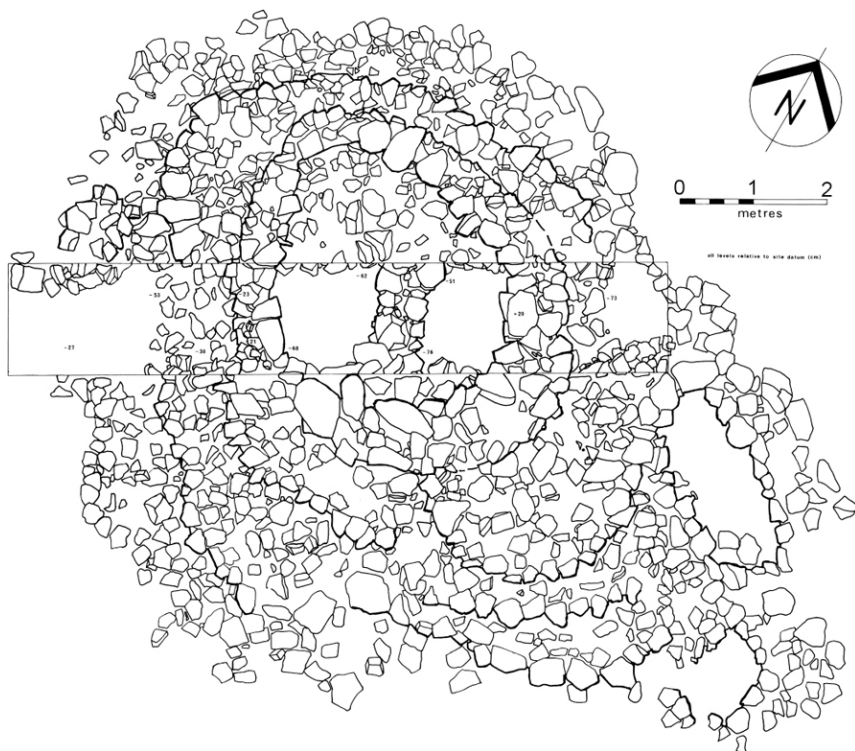


Figure 3.29 Burqu' 11000: general site plan

Summary

Site 27000 saw a long period of presumably sporadic use, and the stratigraphic phasing of the site shows changes in structural form, lithic assemblage, special finds and the faunal remains. A simple two-stage division could be drawn either between Phases 2 or 3 on the basis of the finds or between Phases 3 and 4 on the basis of the structures, but developments in material culture were probably part of a continuous process from the very beginning of the Late Neolithic into the succeeding Chalcolithic period.

During the primary occupation of the site in Phases 1 and 2, evidence from the lithic toolkit matches the radiocarbon dates in indicating (E)LN occupation, probably broadly contemporary with Phase 2 at Burqu' 03000. Similar hearths and bedrock pits were found at Sites 03000 and 35000. The mixture of construction styles, combining drystone walling with the technique of using upright slabs with rubble packing, is fairly common, occurring at both Dhuweila and Site 03000. Construction techniques in the steppe are not sensitive indicators of chronological change. By Phase 3, the finds begin to indicate a gradual transition from the earlier Late Neolithic to the later part of the period. The chipped stone tool kit shows an increasing dependence on locally sourced materials, reflected in the use of pieces made on pebble flakes, while a decline in the proportion of gazelle in the faunal record suggests less emphasis on hunting and a greater dependence on herding. This may also account for the changes in the stone tool kit, as access to water for the flocks becomes a higher priority than long-range movement for hunting and resource gathering, causing the occupants of the sites to spend more time close to the lake. The faunal evidence indicates the strong presence of ovicaprids from Phase 2 onwards, however, suggesting that herding was an integral part of the economy from very early in the life of the site.

Site 11000

Site 11000 lies on the eastern shore of the lake on slightly rising ground near the edge of the basalt. Before excavation, like the other prehistoric sites around the lake, it consisted of a low oval mound of basalt cobbles in which some lines of curving walls could be faintly distinguished (Fig. 3.28). A scatter of flints on and around the mound indicated that the walls might be associated with Late Neolithic occupation levels. An illegible inscription on a basalt slab laid on top of the mound suggested its later use as a burial cairn, perhaps by Safaitic nomads. Trench 100 (9 m × 1.5 m) was laid out across the short axis of the mound (Figs 3.29–3.30) and a surface collection of artefacts was made over the whole site prior to excavation. All stratified deposits were sieved through 5-mm mesh.

<i>Description</i>
<i>Phase ++</i>
Sandy windblown deposits and deflated occupation, surface
<i>Phase 5</i>
Rubble clearance
Windblown sandy matrix around base of rubble of 102
A67102
Rubble and windblown deposits inside structure
<i>Phase 4</i>
Clearing of terrace wall
Clearing of terrace wall
Clearing of terrace wall
Windblown material against outer wall of structure
Clearing of terrace wall
Clearing of terrace wall
Wall of subsidiary external structure
<i>Phase 3</i>
Loose sandy soil below terraces

C19
Clearance of short external wall
C20
Compacted layer below 117
L28
Layer of stones below 120
S29
Stones and sandy soil below 110
Phase 2
Upper rubble layer from within structure
B110
Below 113, stones and sandy deposits, upper level of occupation
O15
Occupation deposits within structure, sandy with some ashy patches
H18
Hearth
A18
A18 15
W21
West wall
E22
East wall
C28
Central wall
Phase 1
L24
Loose dark soil below 118, occupation deposits below level of walls
O25
Occupation deposits below 124, compact sandy soil
O26
Occupation deposits as 125
C27
Compacted clay surface below 126
F80
Below 123

Table 3.45 Burqu' 11000: contexts by phases

Description
B25
Basalt rubber
S10
Stone ring fragment, limestone?
S14
Stone palette, incomplete
B26
Basalt rubber

Table 3.46 Burqu' 11000: special finds

Excavation revealed that the lowest levels in the mound consisted of a thin layer of occupation deposit with no clearly associated structures. Onto this was set an oval stone-walled structure with internal partitions. The fill of the structure contained artefacts of Late Neolithic date. Against the outer face of the Neolithic structure was a bank of earth and rubble over which was built a series of curving terrace walls abutting the outer face of the earlier structure. Subsequent to this, the mound was covered in a layer of loose rubble and windblown sand. The central chamber of the structure seems to have consisted originally of a sub-circular structure built on bedrock and divided internally into two or more small cells. The outer walls were built of large blocks of basalt infilled with a central core of smaller stones. The walls were still preserved to three or four courses. The internal partition revealed in the trench was less solidly built and was only well preserved to one course above bedrock. The maximum depth of deposit in the trench was about 1 m.

Dating

No radiocarbon dates were obtained for Burqu' 11000.

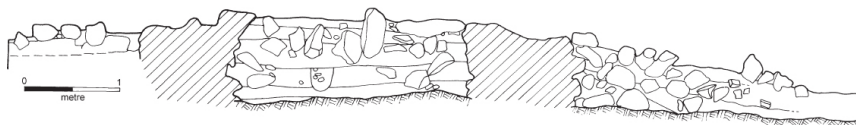


Figure 3.30 Burqu' 11000: south section

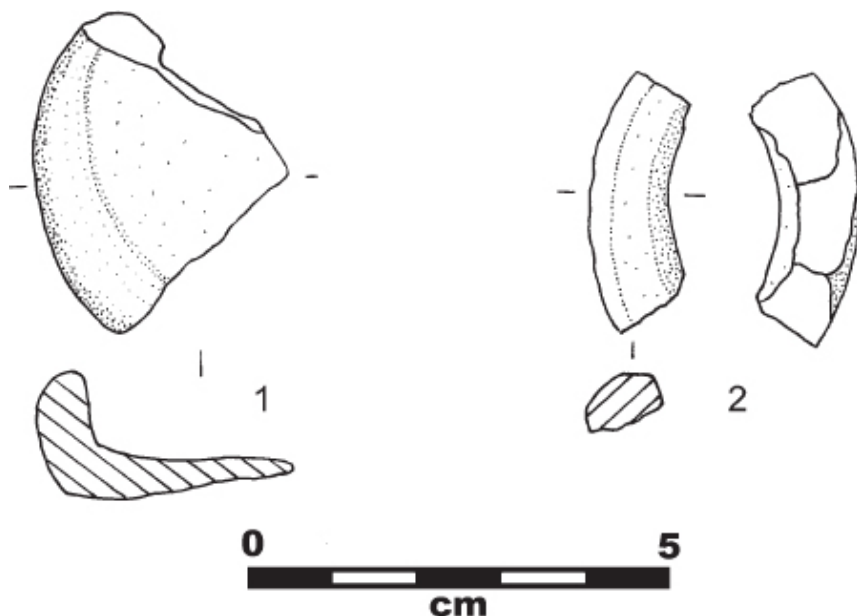


Figure 3.31 Burqu' 11000: special finds. 1. 113/1 broken stone palette; 2. 114/1 fragment of stone ring

Stratigraphy

Phase 1

The first phase was represented by thin layers of dark loose sediment with greater concentrations of chipped stone and bone than found in the phases above.

Phase 2

During Phase 2 the main structure was built. This was oval and of drystone rubble construction with two central chambers divided by a stone partition. The fill, overlying the darker deposits of Phase 1 in the interior, consisted of loose sandy deposits with small stones and rubble and a few finds.

Phase 3

This level consisted principally of earth and rubble fill around the outside of the main structure. Small amounts of chipped stone and bone were found in the fill,

but these may not have been *in situ*.

Phase 4

Developments in this phase seem to have related primarily to the construction of shallow stepped terrace walls or platforms abutting the exterior of the central chamber and overlying the rubble of Phase 3. These walls/platforms were particularly concentrated at the south-western end of the trench.

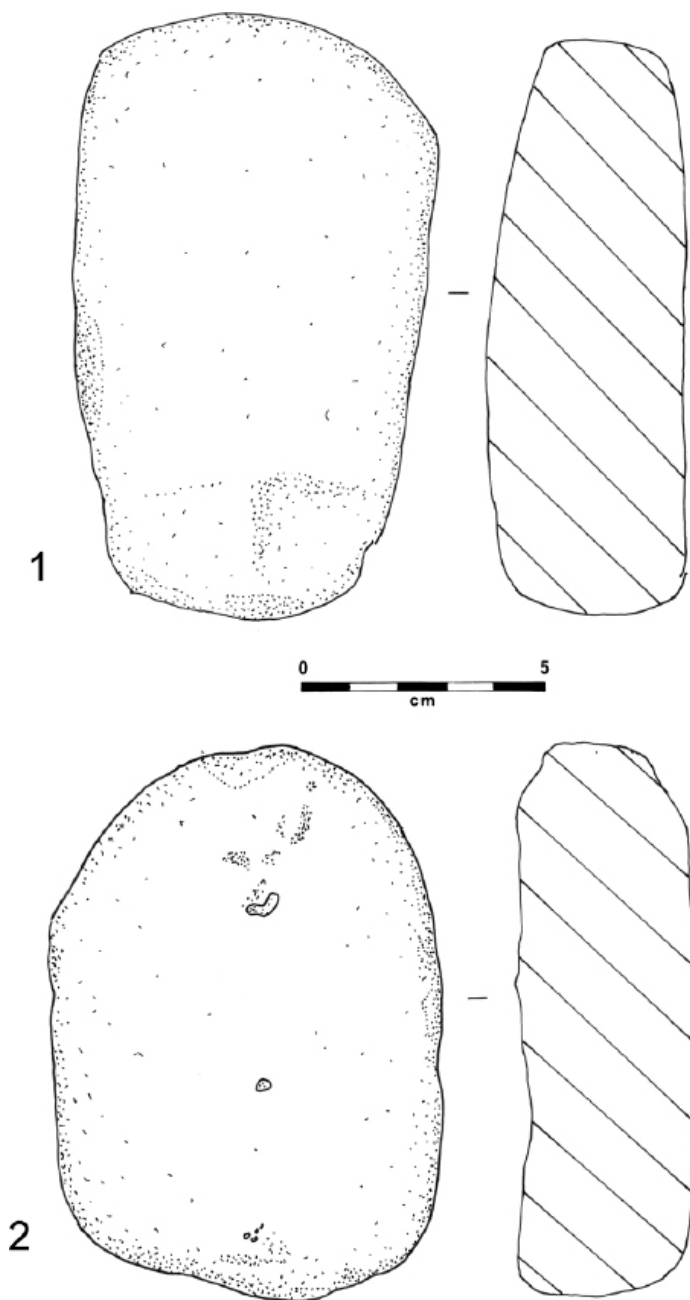


Figure 3.32 Burqu' 11000: ground stone. 1. 126/1 basalt rubber; 2. 113/1 basalt rubber

	1	2	3	4	5	6
Cores	1.00	25.00	21.00	12.00	46.00	15.00
%	0.83	20.83	17.50	10.00	38.33	12.50
Blanks	12.00	22.00	29.00	6.00	15.00	16.00
%	12.00	22.00	29.00	6.00	15.00	16.00
Total	13.00	47.00	50.00	18.00	61.00	31.00
%	5.91	21.36	22.73	8.18	27.73	14.09

Table 3.47 Burqu' 11000: raw material quality

Phase 5

The uppermost level comprised loose rocks and windblown sand covering the walls of the main Phase 2 structure, the outlines of which were visible on the surface prior to excavation.

	<i>Tabular</i>	<i>Cobble</i>	<i>Wadi- pebble</i>	<i>Patina</i>	<i>None</i>
Cores	7.00	95.00	2.00	5.00	11.00
%	5.83	79.17	1.67	4.17	9.17
Blanks	8.00	51.00	0.00	13.00	27.00
%	8.00	51.00	0.00	13.00	27.00

Table 3.48 Burqu' 11000: cortex types

N
Blanks
20727 and core trimming elements
20833
7441s
10001

Table 3.49 Burqu' 11000: total assemblage count

Phasing

++ Unstratified surface collections

5. Upper clearance of rubble. Probably post-Neolithic use of mound. Poorly stratified surface levels, windblown deposits

4. Terrace walls built over earth mound and against Neolithic structure walls

3. Earth and rubble fill below 4, piled against outside of Neolithic structure

2. Fill of Neolithic structure

1. Levels below structure

For contexts by phase, see Table 3.45.

Special finds

Excavations yielded four special finds, including two basalt ground-stone

implements, a fragment of a stone ring similar to those from other sites and a small broken stone dish or palette (Table 3.46; Figs 3.31–3.32).

Chipped stone

Raw materials

An analysis of the raw materials utilized at Site 11000 shows the assemblage to be characterized by the use of cherts of moderately good to poor quality (Table 3.47). High-quality chalcedonic materials represent a low percentage of the blanks sample and are virtually absent from the cores, which are more heavily dominated by relatively poor-quality materials; the resulting pattern for cores closely resembles that of Burqu’ 27000. The blank sample shows greater variety and a distribution that more closely resembles that from Burqu’ 03000. Across the total sample of cores and blanks the distribution is exactly equal between the better-quality materials (Types 1–3) and the poorer-quality types (Types 4–6). This even weighting is characteristic of the group of assemblages including Burqu’ Sites 27000, 18000 and 20000 but excluding Burqu’ 03000 and 35000 (above) and Burqu’ 02000 (below).

<i>N</i>
0000 2
0000 ank
0000 541
0000 7e-1
0000 7e-2
0000 7e-3
0000 ade-1
0000 ade-2
0000 ade-3
0000 adelet-1
0000 adelet-2
0000 adelet-3
0000 fragment
0000 form rejuvenation
0000 ntered platform rejuvenation
0000 sted
0000 rshot
0000 tablet
0000 es and core fragment
0000

Table 3.50 Burqu’ 11000: artefact types – core reduction

<i>Blank type</i>
0000 2
0000 7e/bladelet
0000 541
<i>Tool blank type</i>
0000
0000 7e/bladelet
0000 411

Table 3.51 Burqu' 11000: blank type utilization

In terms of material form, the proportions of types shown in Table 3.48 is characteristic of the Burqu' area. Weathered cobbles typical of the chert carpet that covered the lakeside area are a marked feature of the assemblage, particularly in the core sample. The blank sample exhibits more non-cortical pieces, but also a greater percentage of artefacts struck from pieces with patina instead of the original weathered cortex, indicating that they had been struck prior to their use during the Late Neolithic. A low percentage of crushed butts (9.0%) is consistent with other Burqu' assemblages and correlates well with the relatively tough moderate cherts used, while a somewhat higher percentage of butts exhibiting ring cracks (28.0%) helps to illustrate the presence of the higher-quality cherts in the sample.

Artefact counts

The assemblage of Burqu' 11000 is relatively small and shows a rather high percentage of unworked blanks in comparison to other assemblages, as well as a more moderate level of waste (Table 3.49). These features suggest that blank production was rather over-efficient, producing far more blanks than were utilized for the production of tools: the blank to core ratio was 5.6:1. It is likely, however, that at least some of the unretouched blank sample represents utilized implements, though use-wear analysis is required to confirm or refute this inference. Across the artefact distribution shown in Table 3.50 the assemblage is again dominated by cortical blanks. The low percentage of core trimming elements helps to demonstrate the presence of all stages of core reduction on site as well as the continued attention to the maintenance of core platforms, but also confirms the low level of core preparation present in the reduction strategy.

Core type
25.8% Flaking platform
21.4% (amorphous)
20.4% Edge-of-orientation
10.8% Dorsal
10.2% End-of-flake
9.7% Opposed platform
9.9% Platform
5.6% Flaked piece
Maximum dimensions
33.0 mm
21.7 mm

Table 3.52 Burqu' 11000: core types

Butt type
1.0% Compression
47.0%

Diomed
E100
P500
P510 plain

Blank blank dimensions
23.75 mm
6.17 mm
8.16 mm
3.42 mm

Table 3.53 Burqu' 11000: butt types

The relative percentages of each blank type show the assemblage of Burqu' 11000, like that of Burqu' 27000, to be heavily flake-based (Table 3.51). The production of both blade/blades and spalls is less significant than in the Jebel Naja assemblage and those of Burqu' 03000 and 35000. This shift towards a greater number of flakes is also represented in the selection of particular blank types for the production of tools. As in the Burqu' 27000 assemblage, spalls were rarely used for tool manufacture at Burqu' 11000 and the tool sample shows an increased percentage of diminutive chips used as tools.

Core reduction methods

Core types utilized at Burqu' 11000 are broadly parallel with those of the 27000 assemblage (Table 3.52; Fig. 3.33). Particular differences are the greater use of discoidal and amorphous cores in the former and of change-of-orientation cores and cores-on-flakes in the latter. Both assemblages show the same degree of dependence on other core types, with a notably small exploitation of the bipolar-on-anvil technique at Burqu' 11000 and more prominent at 03000 and 35000. Also similar to the assemblage of Burqu' 27000 is the relatively low percentage of cores that can be defined as exhausted (48.3%); these two assemblages are the only instances in which an exhausted core state represents less than 50.0% of the core sample. This figure suggests a different attitude towards material conservation, particularly when average core size is considered – these show dimensions that differ little from other Burqu' assemblage cores. Across the core sample 35.8% were discarded when they became unworkably small, 24.2% were ruined by deep step scars, only 2.5% exhibited overly obtuse striking platforms, and a mere 5.0% of cores were discarded because of material quality issues, in spite of the generally moderate quality of the cherts employed. The cores from Burqu' 11000 show comparatively few blade/bladelet scars (35.0%), another characteristic shared with the assemblage of Burqu' 27000. These data confirm trends shown by the broader artefact type characteristics listed above, indicating a strong degree of similarity between the organization of the core technology at Sites 11000 and 27000 in particular.

Scar pattern

Table 3.54 Burqu' 11000: dorsal scar pattern

TODO

Table 3.55 Burqu' 11000: major tool groups: absolute and relative counts

Blank variables

An analysis of the butt types (Table 3.53) shows the dominance of fully cortical butts, followed by the plain forms, providing again a distribution close to those of the assemblages of Sites 02000 and particularly 27000. These butt type preferences indicate that core platforms were only simply prepared, if at all, in the majority of cases. The Burqu' 11000 butts are, on average, relatively large in comparison to those from other assemblages from the area, while average blank length, width and thickness dimensions are broadly parallel to data from other assemblages. The Burqu' 11000 blanks can thus be characterized as short and wide flakes exhibiting simple plain or cortical butts. Exactly half of the blanks had salient bulbs, implying a reliance on harder hammers, while diffuse bulbs (27.0%) and flat ventral surfaces (23.0%) are equally present.

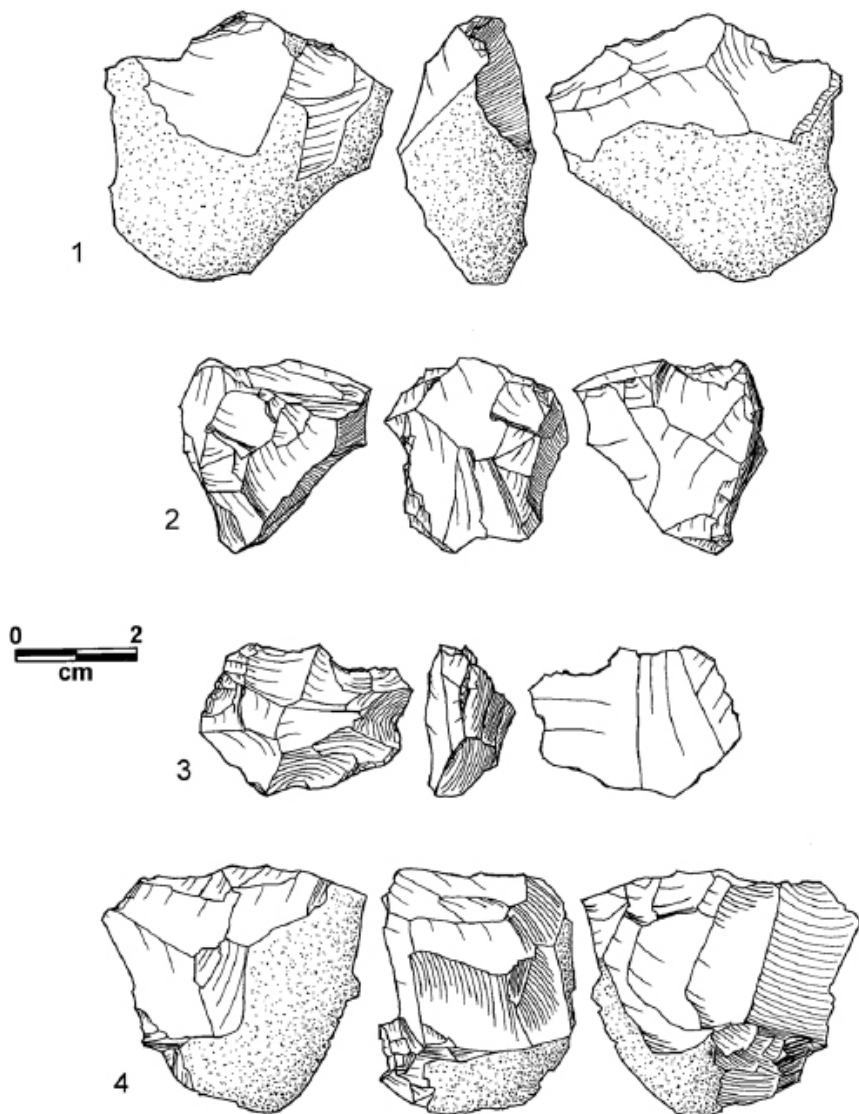


Figure 3.33 Burqu' 11000: chipped stone. 1. Alternate platform core; 2. Mixed platform core; 3. Discoidal core; 4. Crossed platform core

In general, the percentages for different dorsal scar patterns (Table 3.54) are consistent with the data for core type shown above. The value representing the pattern with scars crossed (22%) suggests a greater utilization of change-of-orientation core reduction than indicated by the core sample alone, representing the only significant difference from the same data provided for the assemblage belonging to Burqu' 27000.

Tool typology

The Burqu' 11000 assemblage (Tables 3.55 and 3.56; Figs 3.34–3.36) is similar to the middle levels of Site 27000. Although no radiocarbon date was obtained for the site, technological and typological parallels suggest a date contemporary with the Levantine Yarmoukian. The arrowheads, which are evenly divided between transverse (Fig. 3.36, 1–6) and pointed forms (Fig. 3.34, 7–11), are all of Late Neolithic type. The transverse pieces are most securely stratified, but, given the small sample, this may be of little relevance. Most of the transverse arrowheads are trapezoidal in shape, and several are made of fine-grained smooth creamy/white chalcedony. The pointed forms (Herzeliya and Nizzanim points) are created by fine pressure flaking, predominantly on the dorsal face of the piece. There are few burins, none on truncations. Within the small sample, burins on a break are most numerous.

<i>Tool type</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>++</i>
<i>Arrowhead</i>					
Nizzanim point	1	1	2	0	0
Herzeliya point	1	0	0	0	1
Transverse	5	0	1	1	0
Broken	1	0	0	0	0
<i>Burin</i>					
On break	3	0	0	0	0
Dihedral	1	0	0	0	0
Broken	1	0	0	0	0
<i>Scraper</i>					
Flake, various	2	0	0	0	0
Pebble flake	1	0	0	0	0
End on blade	5	1	0	0	0
End on flake	4	0	0	0	0
Side	3	0	0	0	0
Denticulate	1	0	0	0	0
<i>Biface</i>					
Foliate	1	0	0	0	0
<i>Tile knife</i>					
Tabular knife	4	1	0	0	1
<i>Borer</i>					
Borer	2	0	0	0	0
<i>Drill</i>					
Drill on spall	2	0	0	0	0
<i>Sickle</i>					
Denticulated	1	0	0	0	0
<i>Denticulate</i>					
Denticulate	2	0	0	0	0
<i>Notch</i>					
On flake	1	0	0	0	0
<i>Truncation</i>					
On flake	2	0	1	1	0
<i>Other</i>					
Various	5	0	2	0	0
<i>Retouched piece</i>					
Blade	4	0	0	2	0
Flake	30	1	2	0	0
Pebble flake	17	1	0	2	0
Miscellaneous	16	1	1	1	2
Total	115	6	9	9	3

Table 3.56 Burqu' 11000: tool types: absolute counts by phase

Medium/small flakes and blades truncated 10–20 mm from the bulbar end of the

blank have been found in small numbers on sites in eastern Jordan dating within the Late Neolithic and Chalcolithic periods. They occur at al-Hibr in association with Chalcolithic pottery shapes, and at Sites 02000 and 27000 at Burqu', as well as at Burqu' 11000, where the four examples all have truncations on the distal ends of the flakes – that is, with the bulbar end preserved, which is the most common form of this tool. Two of the four pieces come from Phase 1, the fill of the hut. One piece from Site 11000 has silica gloss; this is a sickle element with deep denticulations typical of Late Neolithic/Yarmoukian examples from settlement sites in the Levant. It is slightly unusual in the context of Site 11000, but is on a similar type of flint to some other tools in the assemblage.

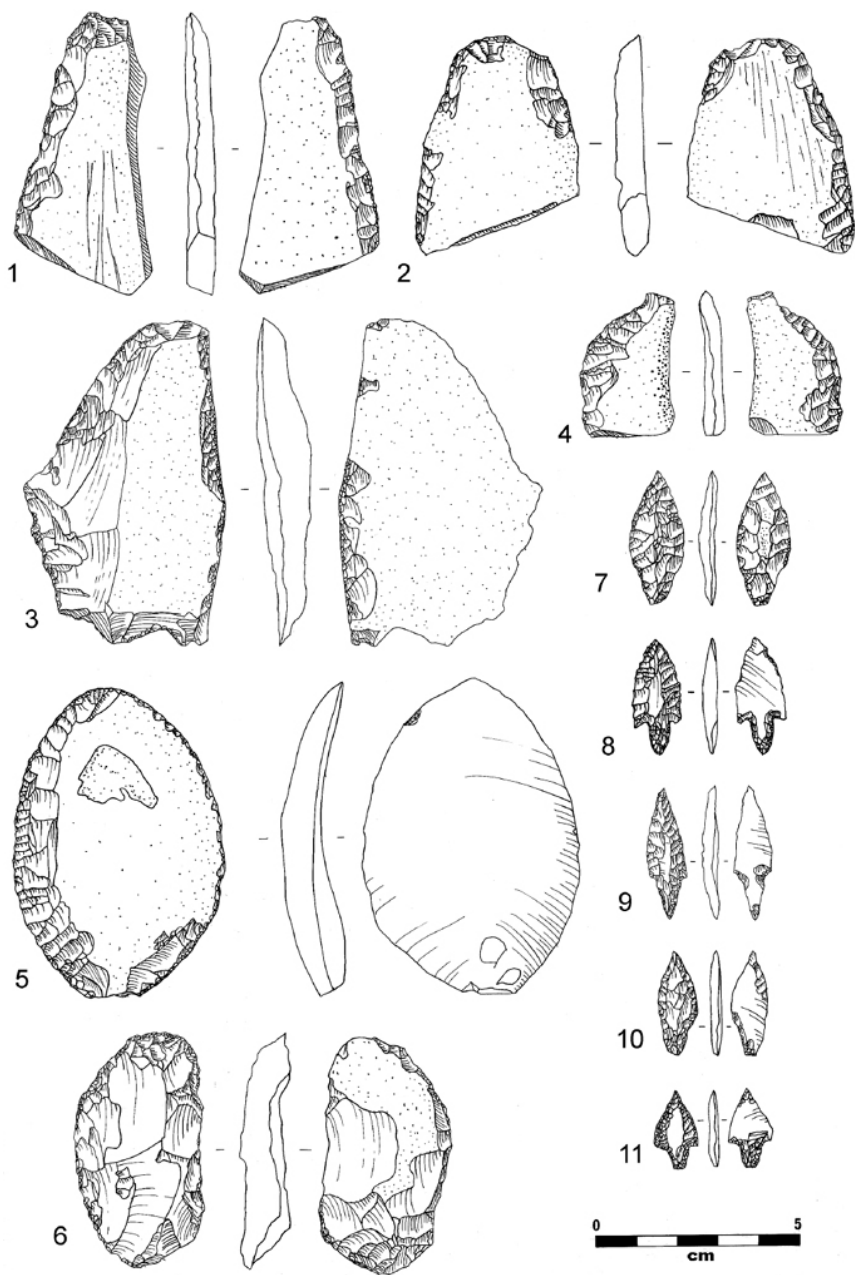


Figure 3.34 Burqu' 11000: chipped stone. 1–4. Tabular knives; 5. Side scraper; 6. Foliate biface; 7, 9, 10. Nizzanim points; 8, 11. Herzeliya points

End scrapers on blades and elongated flakes form a significant component in the

assemblage. Some are pressure flaked while others are formed by more irregular, semi-abrupt retouch. The end scrapers on blades are unusual in their fine working. A number also show differential patination between the body of the blank and the retouch flake scars. This suggests either resharpening of the tool or reuse of blades from earlier sites in the vicinity. There is also one finely worked side-scraper on a cortical flake.

Bifacial knives form a significant component of the assemblage. Most are tabular knives on thin plaques of flint with an edge formed by bifacial pressure flaking. Traces of wear, showing as scratches in the soft cortex parallel to the cutting edge of the tool, can be seen on the knives. Similar tools are found in Late Neolithic contexts in the Middle Euphrates region at the Samarran village of Baghouz near Abu Kemal (ancient Mari) (Braidwood *et al.* 1944) and at Tell Sabi Abyad in the Balikh Valley (Copeland 1989). They also form a significant component of the assemblage at Late Neolithic Dhuweila 2 (Betts *et al.* 1998, 110–12, figs 4.27–4.29). At 11000 there is also one roughly formed foliate biface similar to pieces commonly found in ‘burin Neolithic’ assemblages and at Dhuweila 2.

The four perforating tools are from Phase 1, and consist of two drill bits on burin spalls and two borers formed by semi-abrupt retouch on thickish elongated blanks. Only three notched or denticulated pieces were found. All were rather roughly formed. There is also a small collection of miscellaneous retouched pieces including multiple mixed tools, a retouched thermal flake and intrusive pieces of Middle Palaeolithic and Early Neolithic date. The retouched pieces consist largely of retouched flakes and broken retouched pieces. Nearly half the retouched flakes are cortical pieces from ‘pebble’ cores.

Faunal remains

There were only 25 identifiable fragments from Burqu’ 11000. The total number of unidentified fragments was not counted. The weights of the unidentified and identified fractions are presented in Table 3.57 and show great variation in the percentages of identifiabiles between contexts, with by far the highest proportion of identifiabiles deriving from the poorly stratified contexts of Phase 5.

Three taxonomic groups are represented (Table 3.58): hare is dominant, followed by caprines, with fewer gazelle, although the relative proportions are not meaningful with such small sample sizes. The picture would remain similar even if the insecurely stratified Phase 5 material is discounted.

Discussion

The body parts present for all taxa are mainly the denser elements (metapodial or phalanges, or fragmented teeth), suggesting that there is poor survival of remains generally at this site and possibly that high fragmentation has rendered most bones unidentifiable, and these are simply easier elements to recognize.

A comparison of this small sample with the much larger and seemingly partly contemporary assemblage from Burqu’ 27000 reveals similar patterns. Burqu’ 27000 has a much wider range of taxa than Burqu’ 11000, which will be a product of the larger sample, but the trend of more caprine and hare bones and fewer gazelles is similar across the two sites. Unfortunately, it was not possible to identify any of the caprine bones from 11000 to sheep or goat.

Taxa and skeletal parts

Skeletal parts	
<i>Phase 1</i>	
186 126	maxillary tooth fragment, 2 carpal bones (capetum-trapezoids), 1 unfused first phalanx fragment and 1 proximal metacarpal fragment
126 126	second phalanx
130 130	distal humerus
<i>Phase 2</i>	
114 114	proximal metatarsal fragment
114 114	2 fragments of maxillary teeth and 1 fragment of a mandible tooth
114 114	fragment of mandible
118 118	unfused proximal phalanx fragment
118 118	metacarpals
118 118	phalanx
115 115	mandible fragment
<i>Phase 5</i>	
118 118	metacarpal shaft and 1 thoracic vertebral fragment
118 118	metacarpals, 1 metapodial fragment and 1 first phalanx
102 102	complete metacarpal and 1 pelvis fragment

<i>Weights (g)</i>					
<i>Phase</i>	<i>Context</i>	<i>Non-IDs</i>	<i>IDs</i>	<i>Total weight</i>	<i>%ID</i>
1	124	1	0.0	1.0	0.0
1	126	65	5.0	70.0	7.0
1	130	50	1.0	51.0	2.0
2	113	90	1.0	91.0	1.0
2	114	70	10.0	80.0	12.5
2	115	100	2.0	102.0	2.0
2	116	1	0.0	1.0	0.0
2	118	50	0.5	50.5	1.0
4	105	0	0.0	0.0	0.0
4	106	1	0.0	0.0	0.0
5	102	10	20.0	30.0	67.0
5	107	10	1.0	11.0	9.0
5	112	15	5.0	20.0	25.0
Total		463	45.5		

Table 3.57 Burqu' 11000: weights of identifiable v. non-identifiable animal bones with the

percentage of identified material in the right hand column

	<i>Phase</i>					<i>Total</i>
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	
Sheep/goat/gazelle	0	1	0	0	0	1
Sheep/goat	5	3	0	0	2	10
Gazelle	0	2	0	0	0	2
Hare	2	4	0	0	6	12
Total	7	10	0	0	8	25

Table 3.58 Burqu' 11000: identifiable animal remains (NISPs per phase of occupation)

Summary

Similarities in the architecture and artefact assemblage suggest that Site 11000 is probably contemporary with the middle levels of Burqu' 27000. Likewise, the patterns in the faunal assemblage parallel those shown at Burqu' 27000, suggesting a hunter-herder economy. The site is generally similar in its construction and range of artefacts to the other sites around the lake at Burqu'.

Site 20000

Site 20000 lies north of the Qasr on a slope overlooking the lake, close to the edge of the basalt scatter. Before excavation it appeared as a low concentration of boulders with little evidence of underlying structures, but it was selected for excavation because of the relative concentration of surface flint in the vicinity. A trench 4 m × 1.5 m in size (Trench 100) was laid out down the slope from the higher ground towards the lake. Surface clearance revealed what appeared to be a number of terraces laid out down the slope, which were bounded by lines of basalt cobbles at their lower edges (Fig. 3.37). A rough pavement covered much of the northern end of the trench down to the uppermost terrace wall. In the southern part of the trench bedrock lay almost immediately below the surface. A series of pits were cut into bedrock from the lowest level of occupation.

Dating

No radiocarbon dates were obtained for Site 20000.

Stratigraphy

Phase 1

In this phase were seven pits that had been cut into bedrock from the lowest occupation levels. These varied in shape and size. Some contained artefacts and several appeared to have been ringed with stones at the top.

Phase 2

Phase 2 overlay the bedrock pits and comprised a series of levels immediately above bedrock with darkish ash and decayed organic material. They contained high concentrations of flint, bone and other artefacts. Structures are also associated with this phase. A basalt pavement was laid in the northern end of the trench. This was delimited at the southern side by a rough wall which lay diagonally across the centre of the excavated area. Two low terrace walls further divided the southern sector. The main wall was built at an interim stage of site use during this phase. It rested on occupation deposits, while further occupation levels covered the lower courses of stones.

Phase 3

This level consisted of upper occupation deposits. The soil was sandy and there were fewer finds than in Phase 2.

Phase 4

This phase comprised only topsoil, windblown sand and compacted gravel.

Phasing

+ + Unstratified surface collections

4. Topsoil, windblown sand and gravel

3. Upper occupation deposits, sandy soil

2. Lower occupation levels, wall and pavement, dark organic matrix with high concentration of artefacts

1. Pits cut into bedrock

For contexts by phase, see Table 3.59.

Special finds

The site yielded few special finds. The only artefacts recorded were a basalt rubber from Phase 4 (Table 3.60; Fig. 3.38) and a fragment of carnelian from Phase 2, which may be intrusive. There is little evidence for the use of carnelian in bead-making in the Late Neolithic. This practice seems to arise by the Early Bronze Age (Helms 1991b, 161).

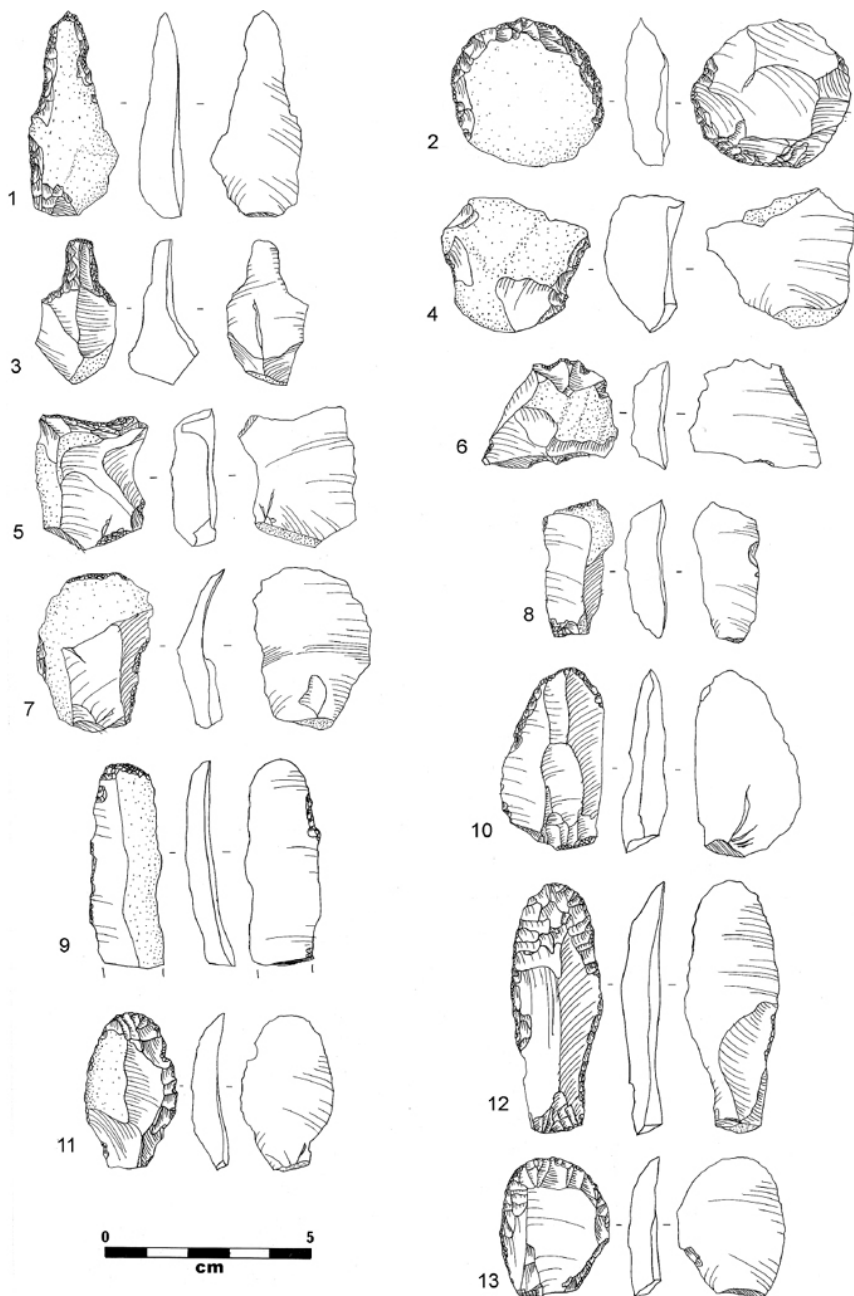


Figure 3.35 Burqu' 11000: chipped stone. 1, 3. Borers on flake; 2, 5–13. End scrapers on flake; 4. Scraper on pebble flake

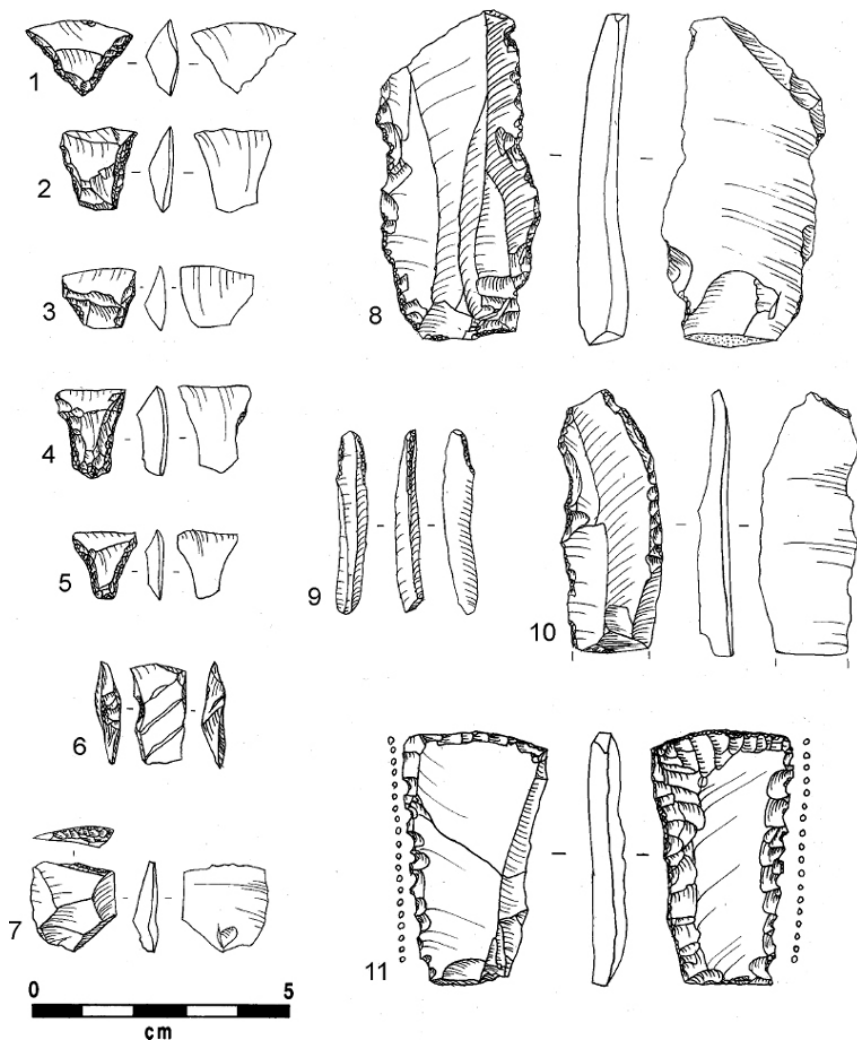


Figure 3.36 Burqu' 11000: chipped stone. 1-6. Transverse arrowheads; 7. Truncation on flake; 8. Denticulated scraper; 9. Drill on span; 10. Retouched blade; 11. Denticulated sickle blade

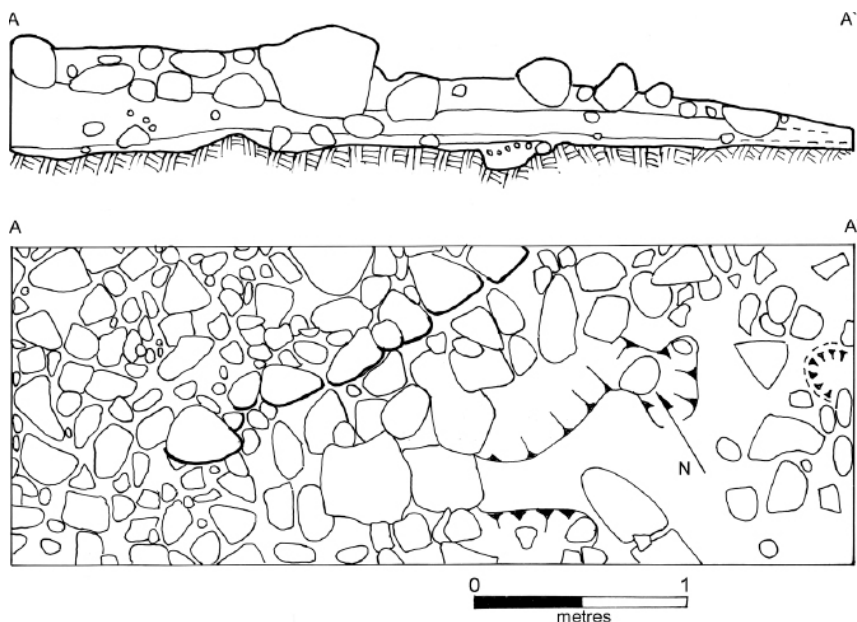


Figure 3.37 Burqu' 20000: plan and section

Chipped stone

Some of the bags containing flint from Site 20000 were damaged in transit and cannot be used for analysis. Nevertheless, a reasonably representative sample is presented here.

Raw materials

As with the assemblages of Burqu' 27000 and Burqu' 11000, materials used in the assemblage from Site 20000 are broadly equally divided between better-quality chert types and the more moderate to poor varieties (Table 3.61). The latter dominate slightly, with 58.7% of the cores and blanks showing the use of these inferior-quality chert types. The absence of crushed butts, along with the low percentage of visible ring cracks (15.0%), supports the greater prominence of more moderate-quality chert types.

While a significant percentage of the blanks sampled show no dorsal cortex, both blank and core samples are dominated by the presence of weathered cobble cortex surfaces (Table 3.62). This characteristic is shown also in the Burqu' 27000 and 11000 assemblages. Tabular material appears only in a small number of cores. Artefacts produced on older flaked pieces showing scars exhibiting heavy patina were somewhat less frequent in the Site 20000 assemblage than in the Burqu' 11000 assemblage discussed above. This pattern of low numbers of reused pieces and near-absence of tabular material is, instead, more closely comparable with the Burqu' 02000 assemblage.

Artefact counts

This assemblage is characterized by its relative lack of tools and core reduction pieces, and a predominance of waste. In these regards it is similar to the Burqu' 35000 assemblage, and both represent a contrast to the greater percentages of tools and core reduction pieces found elsewhere. Considering the damage sustained by the Site 20000 assemblage it is possible that the distribution of artefacts presented in Tables 3.63 and 3.64 is a biased sample, which may also call into question whether the small amounts of core reduction materials and tools from Burqu' 35000 are fully representative. It is notable, however, that the ratio of blanks to cores (3.5:1) is broadly equivalent to that of the Burqu' 11000 assemblage, suggesting that the Site 20000 sample is in fact representative. Setting this question of sample completeness aside, the Burqu' 20000 artefact distribution shown in Table 3.64 is interesting for the low percentage of core trimming pieces compared to the percentage of cores present. The high percentage of angular debris or chunks within the sample are an additional feature suggesting an *ad hoc* approach to core reduction at Burqu' 20000.

<i>Description</i>
<i>Phase ++</i>
100 <u>Loose sand, rocks and windblown deposits, surface</u>
<i>Phase 4</i>
50 <u>Shales and compacted windblown sand</u>
60 <u>Gravel and loose stones</u>
90 <u>buff loose sandy deposit</u>
<i>Phase 3</i>
50 <u>fine pavement</u>
105 <u>West terrace at south end of trench</u>
106 <u>grey occupation deposits with gravel inclusions, on terrace at south end of trench</u>
107 <u>int weathered rock at south end of trench</u>
<i>Phase 2</i>
108 <u>Levels below pavement, loose buff sandy soil, rich in bone and flint</u>
109 <u>compact layer below 108</u>
110 <u>levels below 109, above bedrock</u>
111 <u>below 109, compact sandy levels</u>
112 <u>compact red brown soil with basalt gravels below 111, rich in bone and flint</u>
113 <u>compact red brown soil in south end of trench</u>
114 <u>dark soil with organic material, rich in bone and flint. Below 112</u>
115 <u>below 114 down to bedrock</u>
116 <u>7m terrace wall</u>
117 <u>levels above bedrock</u>
<i>Phase 1</i>
118 <u>Large oval pit cut into bedrock, cut from below 117</u>
119 <u>rectangular pit with blackened base, flint in fill</u>
120 <u>elongated pit cut into bedrock, flint in fill</u>
121 <u>pit cut into bedrock. Fill whitish-yellow soil</u>
122 <u>elongated oval pit with grey sandy fill</u>
123 <u>small oval hollow, no flint</u>
124 <u>deep-sided sub-rectangular pit, some flint in fill</u>

Table 3.59 Burqu' 20000: contexts by phases

Core
Overshot
Core tablet
Scrap and core fragment
Total

Table 3.64 Burqu’ 20000: artefact types – core reduction

Blank type
Blank
Blank/bladelet
Spall
Tool blank type
Blank
Blank/bladelet
Spall
Chip
Total

Table 3.65 Burqu’ 20000: blank type utilization

Core type
Adaptating platform
Blade (amorphous)
Change-of-orientation
Discoidal
End-on-flake
Opposed platform
Single platform
Spurred piece
Maximum core dimensions
32.72 mm
Thickness

Table 3.66 Burqu’ 20000: core types

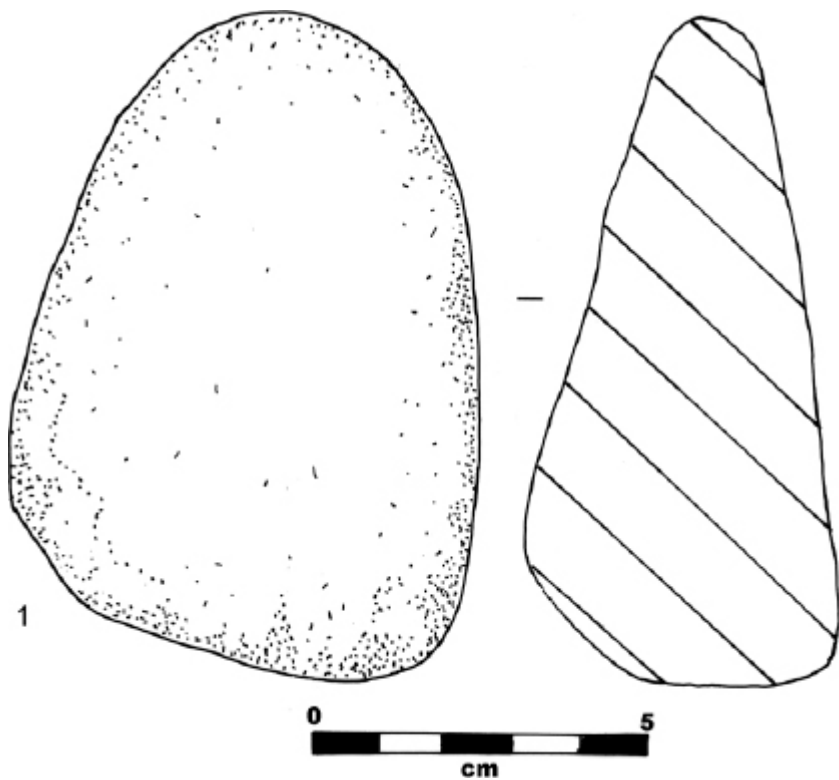


Figure 3.38 Burqu' 20000: ground stone. 1. 101/4 basalt rubber

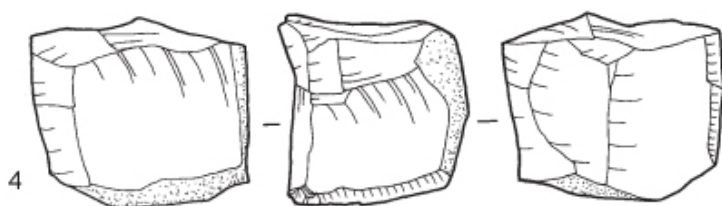
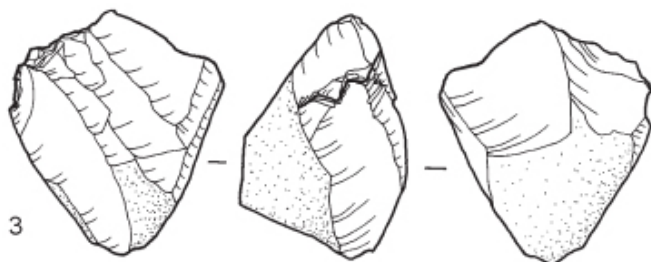
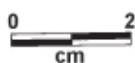
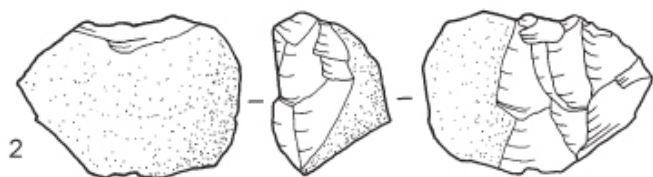
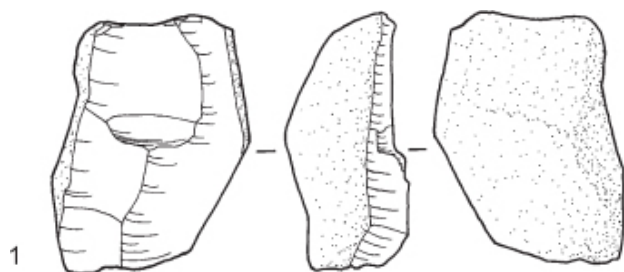


Figure 3.39 Burqu' 20000: chipped stone. 1, 2. Single platform cores; 3. Alternate platform core; 4. Change of orientation core

Butt type
500 pression
400 ex
100 edral
2600 ed
2400
800 t plain
2000 blank dimensions
2100 mm
6100 ness
8100 width
811 thickness

Table 3.67 Burqu’ 20000: butt types

Scar pattern
5100 rectional
1000 ex
2100 ed
1000 ial
7200 rectional

Table 3.68 Burqu’ 20000: dorsal scar patterns

The distribution of dorsal scar patterns is shown in Table 3.68. Unidirectional scars account for nearly three-quarters of the total sample; this proportion is technologically consistent with the significant percentage of single platform cores (above), indicating a comparatively uniform simple core reduction strategy in use at Burqu’ 20000.

Tool typology

Burqu’ 20000 was remarkable for the limited range of artefacts recovered (Tables 3.69 and 3.70). Even allowing for the fact that some material could not be analysed, the collection is still restricted in the variety and quality of retouched pieces. The projectiles apart, almost all the pieces were poorly made and undiagnostic in form. It might be postulated that this could be because the site falls at the later end of the date range for prehistoric sites at Burqu’. However, while the five diagnostic arrowheads – one Nizzanim, one Herzeliya, one Harpasa and two transverse – suggest that it might be dated at the later end of the Late Neolithic sequence, there is an absence of the truncations that occur both in the later Burqu’ assemblages and at al-Hibr.

Faunal remains

The total number of fragments from Site 20000 was 665, of which only 13 (2.0%) were identifiable. The proportion is slightly higher by weight (6.0%), since the larger/heavier fragments tend to be identifiable. Table 3.71 shows the number of identifiable to be very low in each phase, and many contexts had no identifiable at all. This results from the high levels of fragmentation, which will be discussed further below.

Tool type
Barrowhead
Bison
Chert
Corticate
Flint
Other
Unfinished piece
Total

Table 3.69 Burqu' 20000: major tool groups: absolute and relative counts

<i>Tool type</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>++</i>
<i>Arrowhead</i>					
Nizzanim point	0	1	0	0	0
Herzeliya point	0	1	0	0	0
Harpasa point	0	1			
Transverse	0	2	0	0	0
Broken	0	0	0	0	0
<i>Burin</i>					
On break	0	1	0	0	0
Truncation	0	1	0	0	0
Broken	0	1	1	0	0
<i>Scraper</i>					
Flake, various	0	1	0	0	0
Pebble flake	0	3	1	0	0
Side	0	1	4	0	0
Tabular	0	3	1	0	0
<i>Borer</i>					
Borer on blade	0	3	0	0	0
Borer on flake	0	2	0	0	0
<i>Denticulate</i>					
Denticulate	0	4	1	0	0
<i>Notch</i>					
On flake	0	8	1	0	0
<i>Other</i>					
Reused bladelets	0	2	0	0	0
<i>Retouched piece</i>					
Blade	0	8	1	0	0
Flake	0	5	5	0	0
Pebble flake	0	2	0	0	0
Chunk	0	2	1	0	0
Levallois flake	0	1	0	0	0
Total	0	39	16	0	0

Table 3.70 Burqu' 20000: tool types: absolute counts by phase

The amount of animal bone from each of the four main phases of occupation is

variable: no bone at all came from the bedrock pits of Phase 1 and very little from the upper occupation of Phase 3 and the topsoil, Phase 4; most comes from the lower occupation of Phase 2. Correspondingly, there are more identifiables from Phase 2 than the others, although even here they are too few to discuss the relative abundances of taxa, but only enough to discuss the range of taxa represented. Both sheep/goat (specimens could not be further separated) and gazelle are present, and the additional finds of a single specimen each of hare and a medium-sized bird show that the assemblage is not exclusively one of medium-sized mammals.

	<i>Phase</i>					<i>Total</i>
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>++</i>	
Sheep/goat/gazelle	0	4	0	1	0	5
Sheep/goat	0	3	0	0	0	3
Gazelle	0	2	1	0	0	3
Hare	0	1	0	0	0	1
Bird	0	1	0	0	0	1
Total	0	11	1	1	0	13

Table 3.71 Burqu' 20000: identifiable animal remains (NISPs per phase of occupation)

Taxa and skeletal parts

Skeletal parts
Phase 1
There was no animal bone, not even unidentifiable material, from this phase
Phase 2
1 Sheep/goat/gazelle 1a fragment and 1 atlas fragment; they seem gazellelike in size
1 H 1 distal humerus and 1 vertebral fragment
1 Sheep 1a fragment and 1 proximal metacarpal
1 H 1 fused calcaneum
1 Gazelle 1 proximal metatarsal
1 H 1 proximal metatarsal
1 H 1 dist phalanx
1 Bird 1a from a medium-sized bird
Phase 3
1 Gazelle 1 distal metacarpal fragment
Phase 4

Discussion

The condition of the animal bone from Site 20000 is often poor and fragmentation is high, with most pieces being less than 30 mm in length. That the surface condition of the bone is often observed as being 'battered' (especially in Phases 3 and 4, but also for some Phase 2 contexts) suggests that material may have been reworked (moved around in the matrix) or have been part of deflated surfaces. The condition may have been affected by other factors: the presence of small pitting marks on a fragment from Phase 2 hints at gnawing, although the pits appear too small for a medium-sized carnivore (dog/wolf) and are more likely to result from a

fox-sized animal. The few identifiables show that wild animals were arriving at the site in the form of gazelle and hare, while domestic sheep/goat were also present. Overall, the sample resembles most closely the small collections from Burqu' 11000 and 02000. Burqu' 27000 has much higher numbers of sheep/goat than gazelle.

Summary

Site 20000 was less clearly defined than the other sites but had obviously been used in prehistoric times, possibly as an open area rather than as a habitation or covered shelter. The arrowheads suggest a relatively late date for the site; it probably falls in a similar time range to Burqu' 11000 and possibly Burqu' 02000.

Site 02000

Site 02000 lies close to the Qasr on rising ground west of the lake. It consists of a massive burial cairn of uncertain date built over a Late Neolithic camp site. Two soundings were laid out at the base of the cairn where the Late Neolithic site extended out beyond the later stone pile (Fig. 3.40). Investigation of the main cairn was limited to the exposure of the main cist (Fig. 3.41). Excavation in the soundings revealed a small hearth or fire pit and part of a rough wall of basalt cobbles (Fig. 3.42). A small amount of bone and worked flint was recovered. The grave had been constructed of crude basalt corbelling, much of which had subsided into the chamber. Weathering and animal disturbance had removed most of the burial remains, with the exception of a metal and glass earring and some small bone and tooth fragments.

Dating

No radiocarbon dates were obtained for 02000.

Stratigraphy

100

A sounding 2 m × 1 m in size was cut on the south-east side of the mound at the base of the cairn, adjacent to what was believed to be a wall. The uppermost levels (Level 3) comprised roughly 50 mm of loose sandy topsoil over the whole trench. Below this were compact sandy silt levels with some gravel (Level 2), which extended over the whole trench to a depth of about 0.3 m. The only identifiable features were two upright basalt slabs. The lowest levels (Level 1) were of fine greyish-yellow sand with some small stones, was roughly 0.1–0.15 m in depth and lay on bedrock. A hearth or firepit cut into the southern corner of the trench was filled with fine dark grey ash and was defined by a shallow scoop cut into the lowest occupation levels and bedrock. The soil was reddened by heat around the pit. Chipped stone and other traces of occupation were found through all levels from the surface downwards. The wall visible on the surface was preserved for two courses and its construction was associated with Level 1.

200

A second sounding 2 m \times 1.15 m in size was laid down at the edge of the mound. The upper layers comprised compact sand and gravel with some areas of ash and some small pieces of rubble from the cairn. Below this was a jumble of larger stones interspersed with sandy soil containing flint and bone.

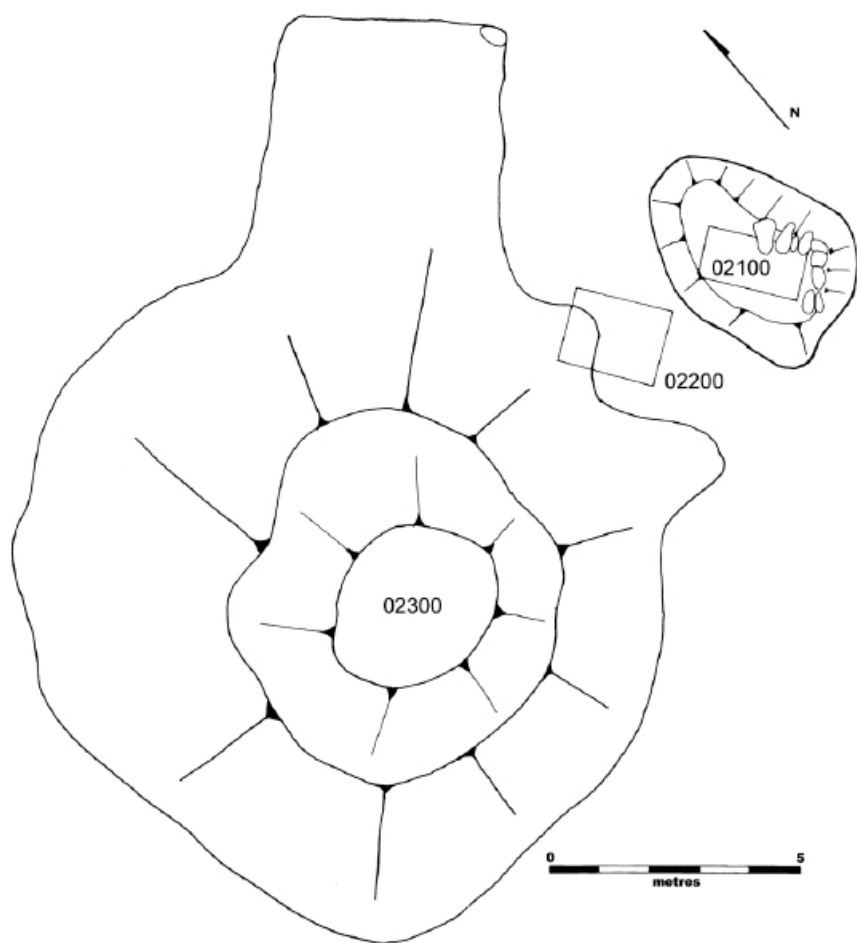


Figure 3.40 Burqu' 02000: general plan



Figure 3.41 Burqu' 02000: 02300 grave

300

The rubble filling of the central cist was cleared and beneath it about 0.3 m of heavily disturbed deposits were excavated down to the surface of the Neolithic mound. These contained an earring, human teeth and bone fragments. From these it was possible to determine that the body was laid with the head at the east end of the cist, which was itself aligned almost perfectly east-west. Among the rubble covering the grave were a number of long rectangular basalt blocks which looked as though they might have been robbed from the Qasr.

Description
100
Phase 3
Loose sand, rocks and windblown deposits, surface
Windblown sand
Phase 2
Gravel and loose stones
Loose windblown sand with gravel and stones
Compact sandy soil with stones
Compact sand soil with stones
Eight basalt slabs
105
Phase 1
Grayish-yellow sand surrounding an ash-filled pit
Dark ashy fill of pit
Reddened soil surrounding pit
Layered basalt gravels and compact sand above bedrock
200
Phase 3
Sandy windblown deposits and surface collection
Windblown sand and gravel

<i>Phase 2</i>
202 ightly compacted sand
203 all ashy patch
204 of ashy patch with small concentration of bone
202 01
202 02
<i>Phase 1</i>
205 mpact sand and gravel with some stones
206 mpact sand and gravel with stones, chunks of bone
207 d with large chunks of basalt
21 210
211 mpact sand with stones
212 aved basalt gravels above bedrock
300
<i>Phase 2</i>
301 ble fill of cist
<i>Phase 1</i>
302 ls of cist
303 per sandy fill of cist
304 er compact sand and rubble in cist
305 of grave, fragments of human bones

Table 3.72 Burqu' 02000: contexts by phases

Phasing

100

- ++ Unstratified surface collections
- 3. Loose windblown sand
- 2. Compacted sandy gravel, two upright stones
- 1. Fine greyish-yellow sand with some small stones, fire pit and fire-reddened earth above bedrock

200

- ++ Unstratified surface collections
- 3. Loose windblown sand
- 2. Compact sandy silt, loose rubble, small ashy patch
- 1. Sandy soil with large stones, occupation debris

<i>Description</i>
202 ss fragment
302 ken basalt grindstone
304 ing: glass bead and metal wire

Table 3.73 Burqu' 02000: special finds

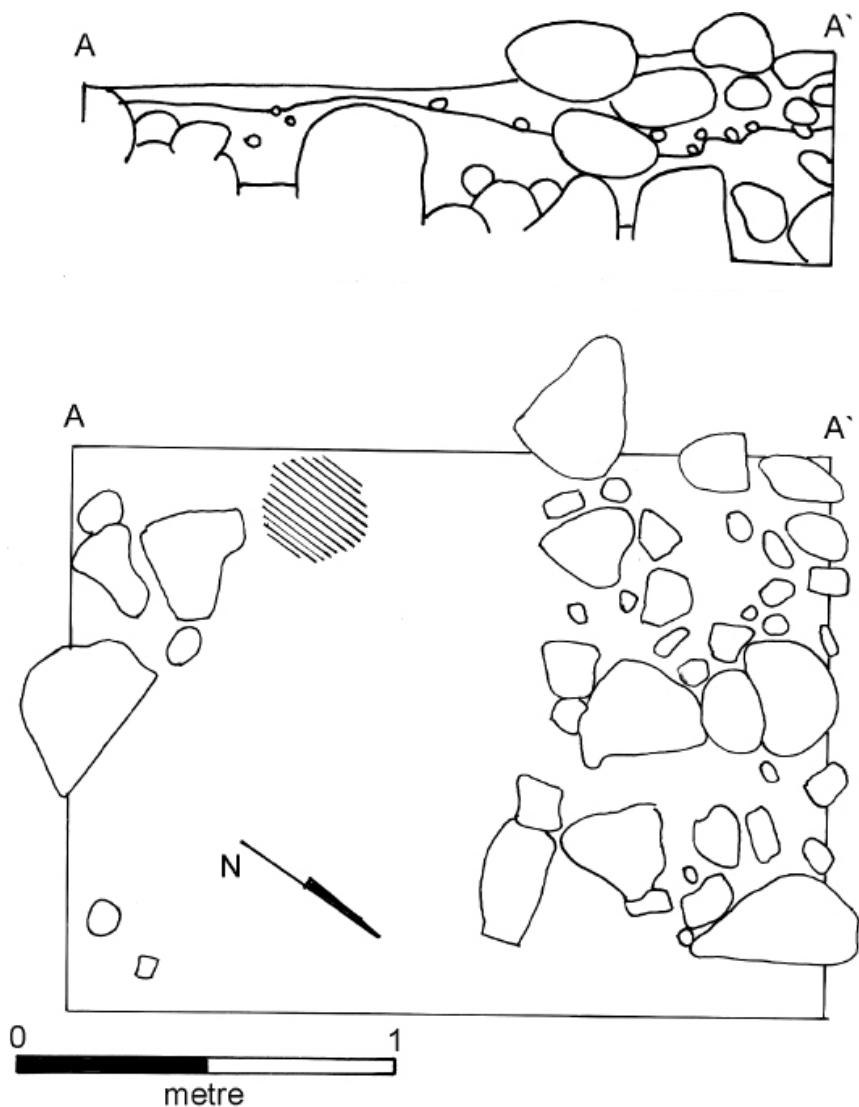


Figure 3.42 Burqu' 02000: 02100 plan and section

300

- 2. Rubble and windblown sand
 - 1. Walls and fill of cist, inhumation
- For contexts by phase, see Table 3.72.

Special finds

There were only three special finds from the site (Table 3.73). The fragment of

glass might be of any period, from historical to recent. The earring was probably associated with the burial, while the grindstone may be Neolithic.

Chipped stone

Like Burqu' 35000, Burqu' 02000 represents a small site with more enigmatic structural features. The small trench opened at the edge of the burial cairn revealed only a small hearth, an extent of rough stone paving and a small cobble wall, but it provided a significant chipped stone assemblage of a somewhat different character from other assemblages in the Burqu' area (Betts 1993, 51).

Raw materials

As with other Burqu' sites, Burqu' 02000 demonstrated the predominant use of the local chert cobbles from the ground surface among the basalt cobbles of the *harra* edge. The material is a relatively good-quality chert, but diminutive in size and typically covered with a thick pitted cortex that has been eroded by wind and sand. The assemblage of Burqu' 02000, however, stands apart for the use of a limited amount of exotic chalcedony. One potential source of chalcedony noted by Betts was located along the border with Saudi Arabia in the vicinity of Tell al-Hibr (see Chapter 5). The use of this exotic raw material at Burqu' 02000 provides a parallel with the limited amount of chalcedony at Dhuweila in Stage 2, where it was particularly used in the Late Neolithic for the production of small arrowheads (Betts 1987, 125).

In terms of quality, the assemblage of Burqu' 02000, like those of Burqu' 03000 and Jebel Naja, demonstrates the utilization of higher-quality materials (Table 3.74). Across the whole assemblage good-quality raw materials (Types 1–3) account for approximately 60% of the sample. A difference can be seen between the core and blank samples, with the latter exhibiting a significantly higher percentage of chalcedony (Type 1 cherts) than the cores. This feature implies that core reduction at the site relied on locally available raw materials, and relatively low percentages for butt deformation characteristics (6.0% crushing and 15.0% percussion rings) correspond to the use of moderate local cherts. In contrast, high proportions of ventral features typically used to infer soft hammer technique (the presence of a lip (41.0%), errailure (46.0%) and ventral rippling (51.0%)) are a feature of this assemblage. Like the greater amounts of imported high-quality chalcedony in the blank and tool samples, this difference in the Burqu' 02000 assemblage implies a greater degree of off-site core reduction – the use of this soft hammer technique being more difficult on the poorer-quality raw material immediately adjacent to the site – with greater numbers of finished tools and tool blanks being carried to the site than is seen in other assemblages in the Burqu' area.

The greater incidence of both non-cortical blanks and, especially, cores in comparison with other assemblages from the area supports the argument for greater use of imported materials at the site, with such cores having been initiated and shaped elsewhere (Table 3.75). Like other Burqu' assemblages, however, the dominant raw material type is that of the local chert cobbles that carpet the Burqu' area.

Artefact counts

The assemblage collected from Burqu' 02000 is moderate in size in comparison with most of those found in the Burqu' area, with the exception of Burqu' 11000 (Tables 3.76–3.77). As with other assemblages, the waste from core reduction dominates the total assemblage. The total proportions of cores and core trimming elements, as well as unworked blanks, are, however, somewhat lower than at other sites, again supporting the contention regarding limited on-site core reduction at Burqu' 02000. The extremely high proportion of blank fragments, paralleled only by that at Burqu' 35000, could suggest a greater degree of knapping error, but, given the other evidence for greater core reduction off-site, it is more likely that a distinct *chaîn opératoire* was utilized. In particular, the presence in the tool assemblage of both truncations and transverse arrowheads demonstrates a greater need for blank segmentation than that shown in other assemblages (see 'Tool typology', below). Thus, it appears that many blanks were produced elsewhere but carried to the site for the final tool production stages.

The dominance of flake blanks within the relative blank types is in accordance with elsewhere, but the distribution of tool blank types is unique (Table 3.78): the very high percentage of chips utilized for tool manufacture results from the prevalence of truncations and transverse arrowheads in the tool repertoire noted above. Correspondingly, the percentage of tools manufactured on blades or bladelets is lower than elsewhere. That this distinction represents a real deviation in tool manufacturing practice is shown by the slightly higher percentage of blades and bladelets among the unworked blanks in comparison to other Burqu' sites, demonstrating the continued manufacture of elongated blanks (as part of normal core reduction), which was not the objective of the regionally dominant tool manufacturing practice.

Core reduction methods

The core sample from Burqu' 02000 showed the smallest core sizes of all the assemblages (Jebel Naja showed the largest). Of primary importance in assessing the core dimensions from each site's sample is the similarity of values for sites located at raw material sources, implying that the size is a deliberate technological choice, as opposed to those such as Dhuweila, which are located at a considerable distance from their raw material sources.

The core types present in the Burqu' 02000 sample (Table 3.79) differ from those of the other Burqu' sites (Fig. 3.43). Very *ad hoc* core types – cores-on-flakes and splintered cores – dominate, while the simple flake core types (single platform, alternating platform and mixed platform or amorphous cores) that are more frequent in other Burqu' assemblages are comparatively rare at Burqu' 02000. Like the assemblages of Burqu' 35000, Dhuweila 2 and Burqu' 03000, the bipolar-on-anvil technique was prevalent in the Burqu' 02000 sample. Of the morphologically distinct core types, discoidal cores were used more frequently at Burqu' 02000. Only the Burqu' 11000 sample shows a similar preference for the production of small flakes. The Burqu' 02000 sample, however, shows the smallest average core size within the Burqu' cluster. The degree of core exhaustion is correspondingly high (80.2%), with diminutive core size (71.4%) being the dominant factor for the termination of core reduction.

	1	2	3	4	5	6
Cores	5.00	25.00	18.00	7.00	27.00	9.00
%	5.49	27.47	19.78	7.69	29.67	9.89
Blanks	21.00	40.00	6.00	10.00	13.00	10.00
%	21.00	40.00	6.00	10.00	13.00	10.00
Total	26.00	65.00	24.00	17.00	40.00	19.00
%	13.61	34.03	12.57	8.90	20.94	9.95

Table 3.74 Burqu' 02000: raw material quality

	<i>Tabular</i>	<i>Cobble</i>	<i>Wadi- pebble</i>	<i>Patina</i>	<i>None</i>
Cores	3.00	59.00	2.00	9.00	18.00
%	3.30	64.84	2.20	9.89	19.78
Blanks	6.00	51.00	1.00	9.00	32.00
%	6.00	51.00	1.00	9.00	32.00

Table 3.75 Burqu' 02000: cortex types

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0002s and core trimming elements
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Table 3.76 Burqu' 02000: total assemblage count

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cores and core fragment
36600

Table 3.77 Burqu' 02000: artefact types – core reduction

Blank type
36600
36600/bladelet
36600
Blank type
36600
36600/bladelet
36600
36600
Other

Table 3.78 Burqu' 02000: blank type utilization

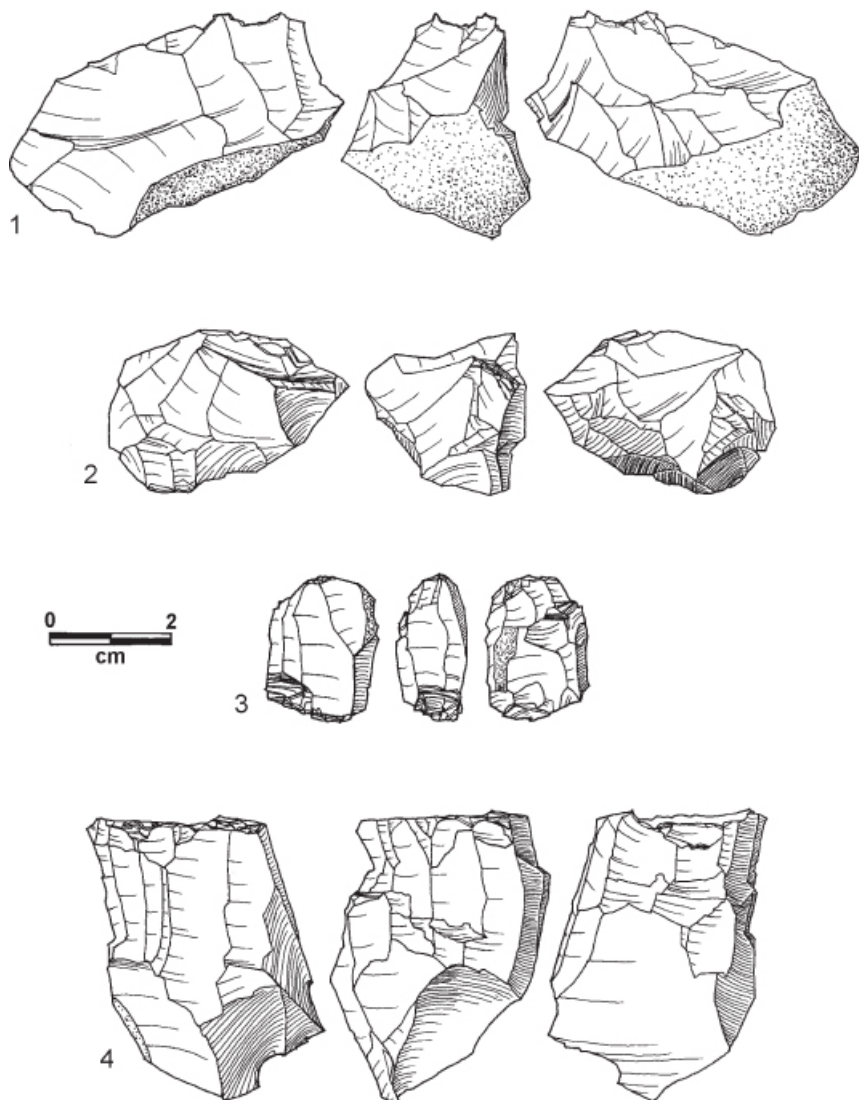


Figure 3.43 Burqu' 02000: chipped stone. 1. Alternate platform core; 2. Discoidal core; 3. Splintered core; 4. Single platform core

Core type

1. Alternate platform

2. Discoidal (amorphous)

3. Splintered

4. Single platform

5. Discoidal

6. Single platform

7. Discoidal

8. Single platform

39.18	Filtered piece
16.41	More dimensions
27.05	Width mm
18.59	Thickness

Table 3.79 Burqu' 02000: core types

Blank variables

Butt types (Table 3.80) are little different from those at the other Burqu' sites, except for the somewhat lower percentage of fully cortical butts in the sample. However, average blank and butt dimensions, which are the smallest of all the Burqu' samples, clearly demonstrate the manufacture of smaller flake blanks than at other Burqu' sites. As with the Burqu' 02000 assemblage, in which there are ventral indicators of a greater degree of soft hammer core reduction, bulb types show a lower percentage (27.0%) of salient bulbs on the flake surface in comparison to diffuse or compact bulbs (45.0%), distinguishing this assemblage from others in the Burqu' cluster in terms of knapping technique. The somewhat greater presence of flat bulbs (28.0%) supports the greater use of the bipolar-on-anvil technique noted above for Burqu' 02000.

Butt type
Compression
39.00x
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22.00
21.10
22.00
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Table 3.80 Burqu' 02000: butt types

Scar pattern	
Bidirectional	
3.00	ex
06.00	ed
0.00	al
74.00	directional

Table 3.81 Burqu' 02000: dorsal scar pattern

Knoll type
13.77 Whed
16.71 n
5.28 per
11.45 ce

189knife
 15r
 681
 1422ation
 66r
 118retouch
 9889

Table 3.82 Burqu' 02000: major tool groups: absolute and relative counts

The dorsal scar patterns listed in Table 3.81 show the lowest percentage of cortical examples of all Burqu' samples. More distinct, however, is the greater dominance of unidirectional knapping in the Burqu' 02000 assemblage, which accords with the use of simple cores-on-flakes. The absence of radial scars in the sample is at odds with the prevalence of discoidal cores in the assemblage, though examples with unidirectional scars can be produced by that method. Equally, such differences between the core and blank samples are likely to be indicative of already-struck blanks being introduced to the site from elsewhere.

Tool typology

Typologically, Burqu' 02000 appears to overlap with the later periods of occupation at Sites 11000 and 27000 (Tables 3.82 and 3.83; Figs 3.44–3.45), but may extend slightly later in time. Knapping techniques and raw materials are similar at Burqu' 11000, but there are fewer truncation burins. The raw material used in the Burqu' 02000 assemblage includes moderate proportions of tan and creamy chalcedony, and the overall size of the debitage is much smaller than in the case at Burqu' 03000. While small tanged arrowheads are still present (Fig. 3.45, 11–14), the projectile class is dominated by transverse forms (Fig. 3.45, 1–10), many made from chalcedony. The main tool types are truncations (Fig. 3.45, 15–21) and pebble flake tools. Truncations and small numbers of transverse arrowheads are a feature of the Chalcolithic industry at al-Hibr and, while 02000 is certainly earlier than al-Hibr, it appears to represent a transition towards this later industry. A change in raw material resource procurement patterns and/or types of task carried out at the site has meant that the large tools such as flake scrapers have disappeared. Some tools are restricted in size by the small locally obtained pebbles, while others on imported materials, particularly chalcedony, are restricted by design, but also by the size of the chalcedony nodules, which occur in lumps only a few centimetres across.

<i>Tool type</i>	<i>100</i>				<i>200</i>			
	<i>1</i>	<i>2</i>	<i>3</i>	<i>++</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>++</i>
<i>Arrowhead</i>								
Nizzanim point	2	1	2	0	5	1	0	0
Herzeliya point	0	0	1	0	0	0	0	0
Transverse	0	5	5	3	0	22	4	2
Broken	0	0	0	0	0	0	0	0
<i>Burin</i>								
On break	2	1	1	0	2	0	1	0
Truncation	0	0	0	3	0	2	0	0
Dihedral	0	0	0	0	1	0	0	0
Broken	0	1	1	0	0	1	0	0
<i>Scraper</i>								
Flake, various	0	0	1	1	0	1	0	0
Pebble flake	0	1	0	0	1	0	0	0
End on flake	0	0	4	2	0	3	0	0
<i>Biface</i>								
Misc.	0	0	0	1	0	0	0	0
<i>Tile knife</i>								
Bifacial knife	0	0	0	0	0	2	0	0
<i>Borer</i>								
Borer	0	0	1	0	0	0	0	0
<i>Drill</i>								
Drill on spall	0	0	0	1	0	1	0	0
<i>Truncation</i>								
On flake	2	1	4	0	5	0	0	0
On blade	8	10	4	0	15	2	3	0
<i>Other</i>								
Other	0	1	0	1	0	4	0	0
<i>Retouched piece</i>								
Blade	0	1	1	6	0	3	0	2
Flake	0	1	2	6	0	7	0	0
Pebble flake	0	0	0	0	0	3	0	0
Broken	0	6	5	4	0	18	3	6
Total	14	29	32	28	29	70	11	10

Table 3.83 Burqu' 02000: tool types: absolute counts by phase



Figure 3.44 Burqu' 02000: chipped stone. 1–10. Transverse arrowheads; 11–14. Nizzanim points; 15–21. Truncations; 22, 25. Retouched blade; 23. End scraper on flake; 24. Retouched flake; 26, 27. Scraper on pebble flake; 28–30, 32. Retouched pebble flake; 31. Borer on blade

Faunal remains

There are only 12 identifiable fragments from Burqu’ 02000. The total number of unidentified fragments was not counted, although the weights of the unidentified and identified fractions show wide variation in different contexts. Most bone came from the Phase 1 occupation deposits, fire pit and burial cist. Table 3.84 shows that four taxonomic groups were present: sheep/goat, gazelle, equid and hare (relative proportions are meaningless with such small sample sizes). It should be noted that the single equid bone derives from a surface context.

Taxa and skeletal parts

Skeletal parts	
Phase 1	
Sheep/goat/gazelle	1 fragment
Sheep/goat	1 fragment of a lumbar vertebra, 1 proximal metatarsal and 1 pelvis fragment
Equid	1 fragment
Gazelle	1 distal metatarsal
Phase 2	
Sheep/goat/gazelle	1 proximal metatarsal and 1 indistinct tooth fragment
Equid	1 third phalanx fragment
Hare	1 proximal metacarpal
Phase ++	
Equid	1 fragment of tooth (either mandible or maxillary)
Sheep/goat	1 proximal metatarsal

	Phase				Total
	1	2	3	+	
Equid	0	0	0	1	1
Sheep/goat/gazelle	1	2	0	0	3
Sheep/goat	4	0	0	1	5
Gazelle	1	1	0	0	2
Hare	0	1	0	0	1
Total	6	4	0	2	12

Table 3.84 Burqu’ 02000: identifiable animal remains (NISPs per phase of occupation)

Discussion

The body parts present for all taxa are mostly denser elements (metapodia, phalanges, fragmented teeth), suggesting either poor survival of bone at this site, or that high fragmentation has led to low identifiability, or both. The presence of sheep/goat is noteworthy, but they cannot be said to ‘dominate’ this collection, since sample sizes are so small, and it is also uncertain which animals the sheep/goat/gazelle material belongs to.

Summary

The site has two distinct periods of use: a prehistoric occupation site and a later burial. The burial appears to post-date the active use of the Qasr, as some stones may have been robbed out from the ruins to supplement those from the underlying prehistoric mound. Other than this, the grave could not be dated. Investigation of the prehistoric site was not as extensive as with some of the others as excavation was limited to the more peripheral parts of the mound because of the later burial cairn. Hearths and traces of walls were found, however. The flint assemblage is distinctive, with a number of elements that suggest it falls quite late in the prehistoric sequence at Burqu', possibly being comparable to the end of the Site 27000 sequence as represented by the deflated surface layers.

Site 18000

Burqu' 18000 lay on a moderate north-facing slope near the south-western shore of the lake, opposite the Qasr. It comprised a terrace wall built of massive basalt blocks and enclosing a sloping gravel-strewn terrace. Within this were a number of internal walls set back from the main terrace wall. Chipped stone, ashy deposits and bone fragments were found within the internal walls, and some coarse grey ware pottery was also recovered from the upper levels. A trench 4 m × 4 m in size was laid out across the site (Figs 3.46–3.48). The extent of the site was much less clear than at the other excavated sites, where the occupation was concentrated in and around reasonably well-defined stone mounds. Excavation at Site 18000 revealed a complex and sporadic occupation history.

Dating

No radiocarbon dates were obtained for Burqu' 18000.

Stratigraphy

Phase 1

The northern face of the site was defined by a terrace wall of massive sub-rectangular basalt blocks. Behind this were set a number of irregular rubble walls containing occupation levels. There were also some smaller internal stone features of undefined purpose.

Phase 2

In Phase 2, the use of the walls generally appears to have continued with some modification. One internal area was roughly paved and more small internal stone features were laid out.

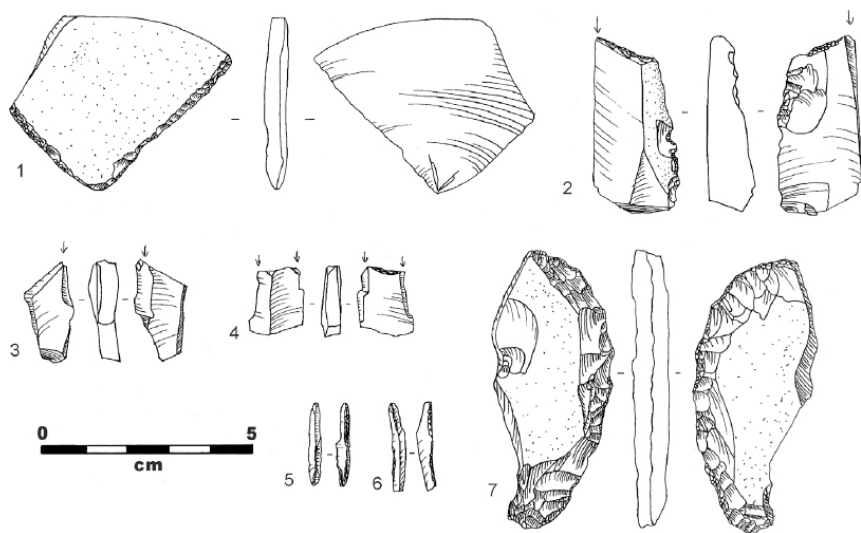


Figure 3.45 Burqu' 02000: chipped stone. 1. Tabular scraper; 2, 4. Truncation burins; 3. Burin on break; 5, 6. Drills on spans; 7. Biface

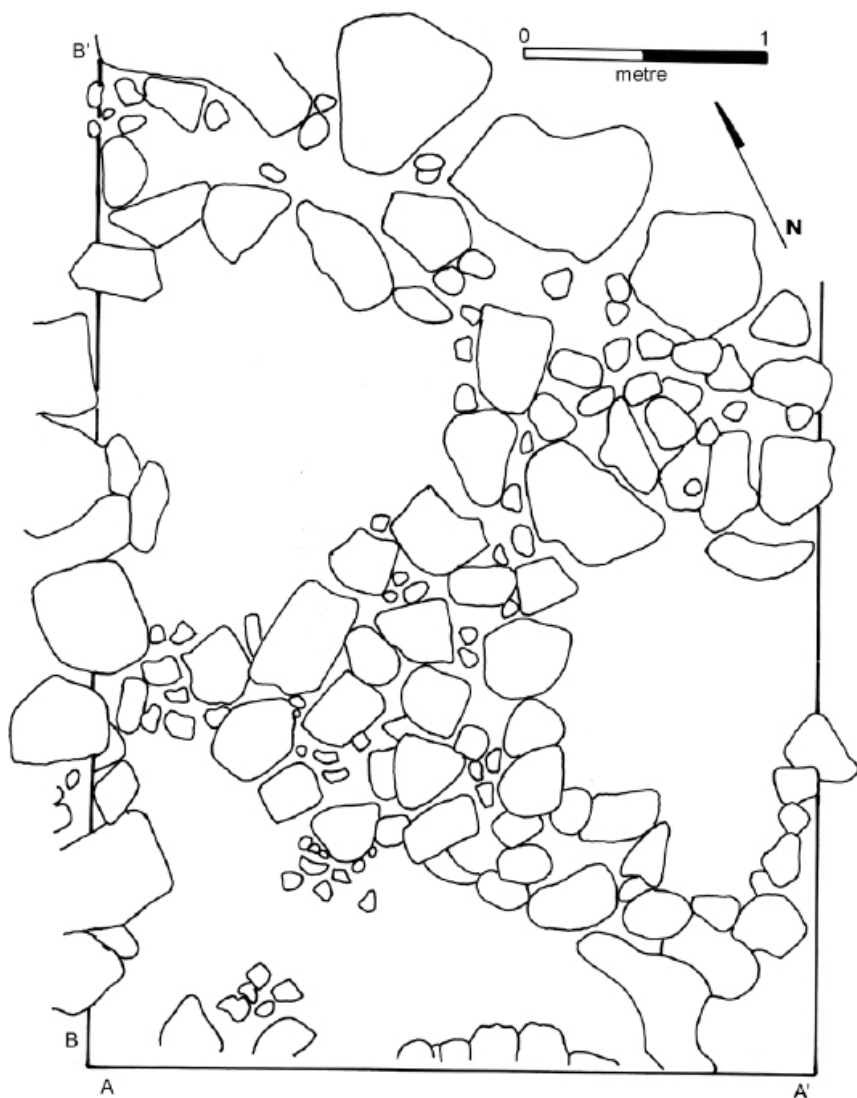


Figure 3.46 Burqu' 18000: plan

Phase 3

As in Phase 2, the site continued to see sporadic occupation with some internal restructuring. Pottery was included in the finds from the occupation levels.

Phase 4

Phase 4 consisted of some deflated layers with a small amount of reuse.

Phase 5

The uppermost phase consisted of deflated occupation deposits with windblown sand.

Phasing

5. Surface clearance and topsoil, removal of surface rubble
 4. Upper occupation levels and later erosion deposits
 3. Walls and occupation deposits
 2. Lower phase of occupation deposits and small internal features
 1. Occupation deposits and small internal features above bedrock
- For contexts by phase, see Table 3.85.

Special finds

There were five special finds from Burqu' 18000 (Table 3.86). One glass fragment comes from the upper levels and may date to late use of the site in the historical periods, perhaps at the time of occupation at the Qasr. The second was found in the upper levels of Phase 4 and probably dates to around the same period. A basalt rubber, also from Phase 4, could be *in situ* or reused from earlier prehistoric occupation (Fig. 3.49). The ostrich shell fragments from Phase 2 and the mother-of-pearl from Phase 1 are likely to be directly associated with the other finds from those levels. Mother-of-pearl was also found well stratified at Burqu' 27000. Eleven coarse ware body sherds were recovered from the earliest three phases at the site. The sherds are hand-made and all but one have dark red well-fired fabrics with basalt inclusions. One from Phase 3 (117) is of evenly fired grey ware with sand inclusions.

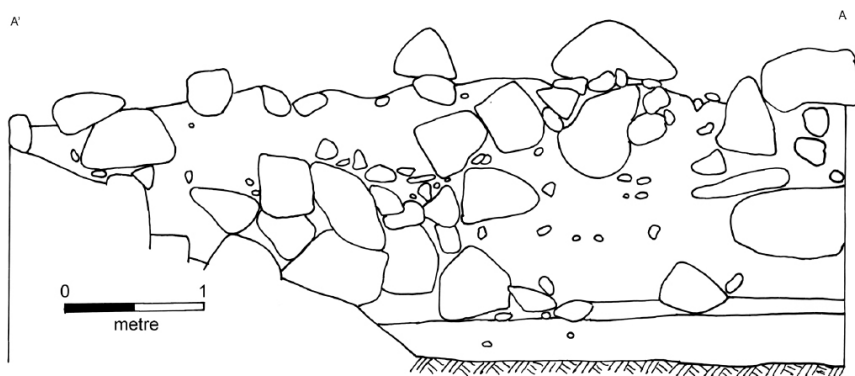


Figure 3.47 Burqu' 18000: south section

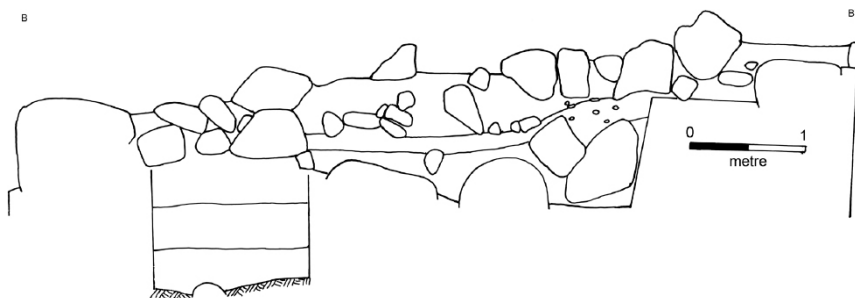


Figure 3.48 Burqu' 18000: west section

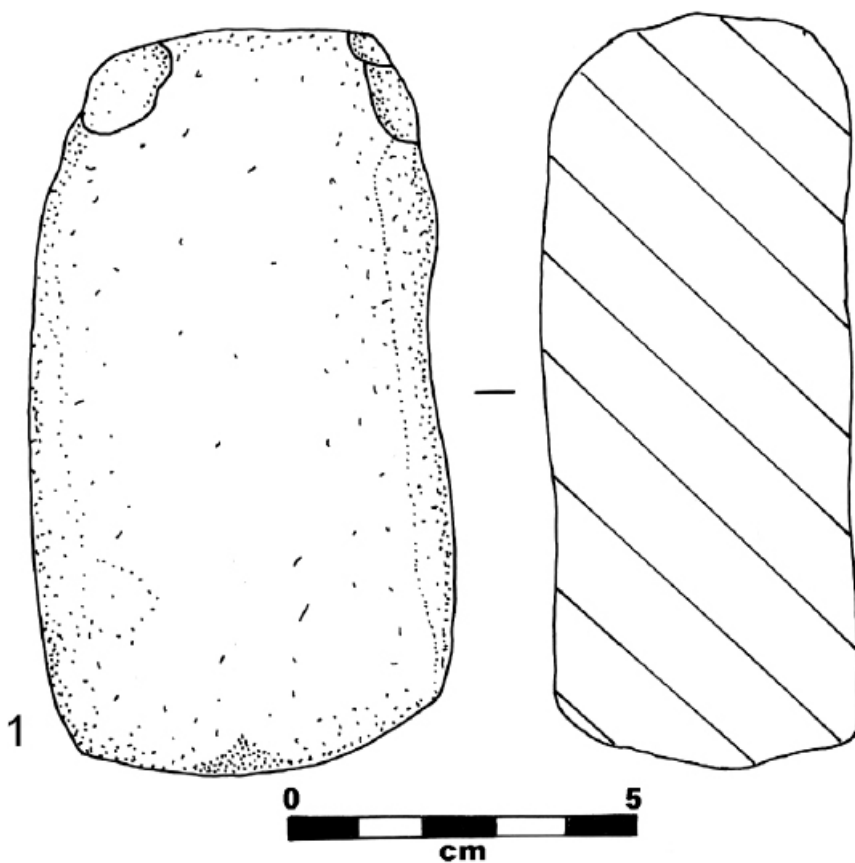


Figure 3.49 Burqu' 18000: ground stone. 1. 112/3 basalt rubber

Chipped stone

Raw materials

Material quality (Table 3.87) shows the use of somewhat better raw materials at Site 18000 in comparison with most other Burqu' sites. The combined percentages of Types 1 to 3 (55.7%) is close to the same measurement for the Burqu' 02000 assemblage, but without the pronounced dichotomy between the core and blank samples shown by the latter assemblage. The good quality of the raw materials selected is confirmed by the relatively high percentage of crushed butts (18.0%), which is higher than at other Burqu' cluster sites, and the percentage of butts exhibiting ring cracks (8.0%), which is reminiscent of the Burqu' 35000 sample. These values are still low, however, and appear to also reflect the choice of hammer type and presence of significant platform cortex as much as material quality.

The assemblage from Burqu' 18000 is consistent with other assemblages from the Burqu' cluster in being dominated by the use of the local weathered cobbles (Table 3.88). As at Burqu' 11000, 27000, 02000 and 20000, the on-site reduction of tabular material was insignificant. This feature of the core technology is at odds with a strong presence in the tool sample of retouched tabular pieces – namely, scrapers – suggesting that the latter may have been manufactured elsewhere and brought to the site as finished tools. However, 26.2% and 58.0% of the core and blank samples respectively exhibited no cortex, showing that extensive core reduction occurred at the site; in this, the assemblage is similar that at Burqu' 02000 in particular.

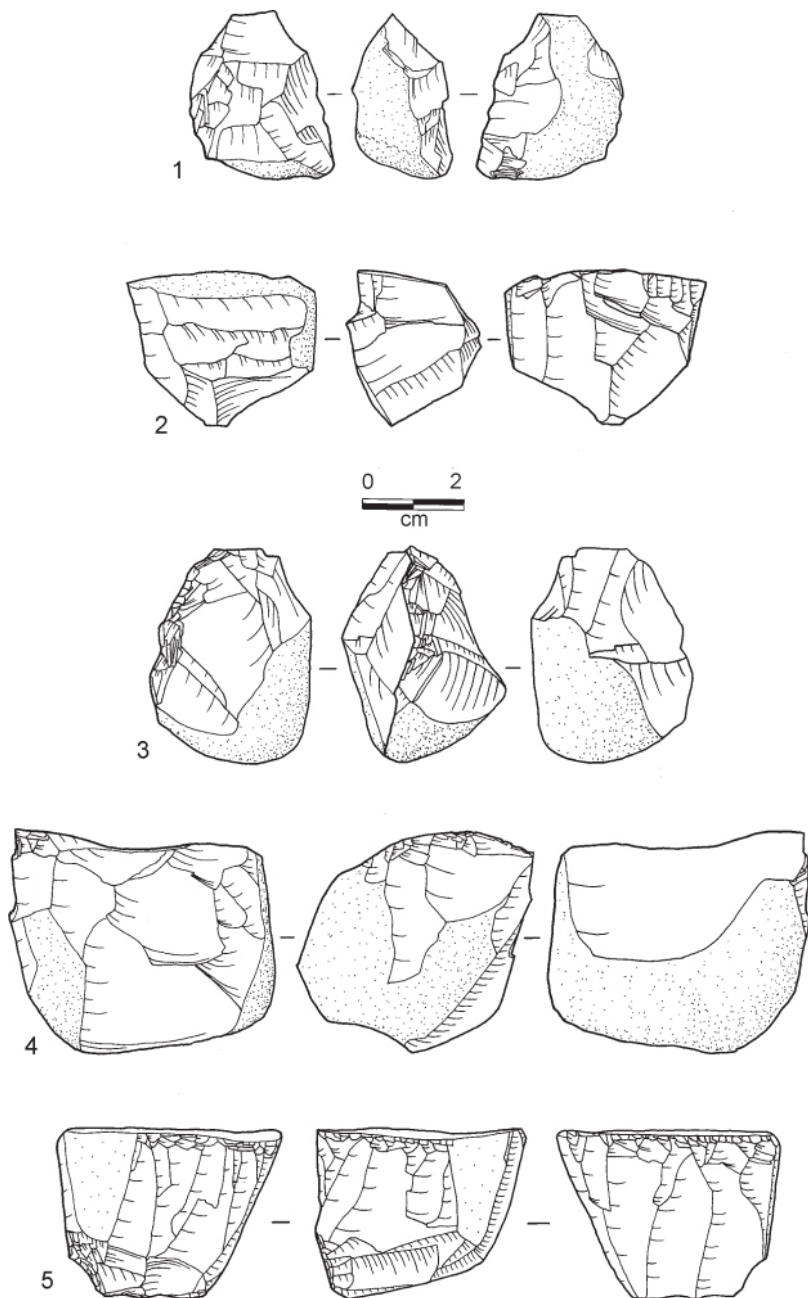


Figure 3.50 Burqu' 18000: chipped stone. 1. Mixed (amorphous) core; 2. Change of orientation core; 3. Alternating core; 4. Single platform core; 5. Change of orientation core

Artefact counts

There is a predominance of debris in the range of artefacts present in the Burqu' 18000 assemblage, which is broadly consistent with other sites in the Burqu' area (Tables 3.89 and 3.90). The percentage of tools, however, indicates intensive tool manufacture, providing a parallel to the assemblage from Jebel Naja. The percentage of unworked blanks and core reduction pieces are correspondingly reduced, and the ratio of blanks to core reduction pieces (7.8:1) suggests a level of blank production that exceeds other Burqu' sites. One difference between the pattern of blank production at Burqu' 18000 and elsewhere in the Burqu' area is the higher numbers of fully non-cortical blanks produced, reversing the prominence of cortical examples in other assemblages. This feature is, again, more similar to Jebel Naja, and particularly Dhuweila, where raw material conservation was at a premium. This distinction in the Burqu' 18000 assemblage implies a difference in the organization of the core technology which is less easily explained here, in an area rich in chert, than at Dhuweila: at Burqu', although there was no need to work cores extensively, yet this choice was apparently made.

The dominance of flake blanks as well as the preference for the selection of flakes for the manufacture of tools are features of the Burqu' 18000 assemblage shared with the Burqu' 27000, 11000 and 20000 assemblages (Table 3.91). The use of burin spalls in the assemblage is correspondingly insignificant. Diminutive chip blanks represent a significant percentage of the tools, but are not a dominant tool blank type as they are at Burqu' 02000. These characteristics are, instead, closest to the Burqu' 20000 tool sample.

<i>Description</i>
<i>Phase 5</i>
W0 Windblown sand
W1 Windblown sand and stone rubble
R0 Rubble and gravel
C0 Compact sand and gravel
W1 Windblown sediment on terrace wall
<i>Phase 4</i>
C0 Concentration of small stones
C0 Compact sand and gravel
C0 Occupation deposits with concentration of bone
C0 Compact sand and gravel surrounding 104
C0 Compact sand and gravel
C0 Concentration of small stones
S0 Sediment between terrace wall and wall of structure, compact sand and gravel
<i>Phase 3</i>
C0 Compact gritty sand with small stones, interior of structure
W0 Wall of structure
S0 Sediment below 112, compact sand and gravel
S0 Sand and gravel between terrace wall and 113
A0 Area 15
I0 Interior of structure. Fill included some sherds
B0 Below 117 in interior of structure
B0 Between terrace wall and 113, below 116
S0 Sand in and around stones of 113
F0 Flat stone slab in interior of structure

S22	and gravel below 115
S23	nd wall of structure, single course of stones
<i>Phase 2</i>	
D24	ish brown sediment with concentrations of bone below 123
S25	all arc of stones, possible foundation for robbed out feature
T26	d wall of structure
L27	ge flat stones
S28	iment below 113
S29	iment below 126
S30	iment below 125
C31	mpact sand beside 125
<i>Phase 1</i>	
S32	all stone feature with dark ashy soil below 130
D33	ak ashy sediment
C34	in which 132 was set
S35	tion cleaning
L36	se gritty soil
S37	ne feature
H38	36
C39	mpact gritty soil
L40	se brown soil, small amounts of flint and bone
S41	ne feature
L42	se dark soil around 141
W43	ite plaster like patch
L44	se brown soil below 140
C45	mbly soil above bedrock
C46	mpact sediment
C47	ty compact soil
F48	ill, loose dark brown soil
A49	47
S50	crusting above bedrock
B51	rock

Table 3.85 Burqu' 18000: contexts by phase

<i>Description</i>
S60 ss fragment
B61 alt rubber
C62 ss fragment
S63 arse ware body sherds
S64 arse ware body sherds
O65 rich egg fragment
S66 arse ware body sherd
S67 arse ware body sherds
M68 her-of-pearl fragments

Table 3.86 Burqu' 18000: special finds

	1	2	3	4	5	6
Cores	2.00	9.00	10.00	5.00	4.00	1.00
%	6.45	29.03	32.26	16.13	12.90	3.23
Blanks	6.00	32.00	14.00	15.00	24.00	9.00
%	6.00	32.00	14.00	15.00	24.00	9.00
Total	8.00	41.00	24.00	20.00	28.00	10.00
%	6.11	31.30	18.32	15.27	21.37	7.63

Table 3.87 Burqu' 18000: raw material quality

	Tabular	Cobble	Wadi-pebble	Patina	None
Cores	3.00	10.00	0.00	1.00	5.00
%	15.79	52.63	0.00	5.26	26.32
Blanks	0.00	39.00	1.00	2.00	58.00
%	0.00	39.00	1.00	2.00	58.00

Table 3.88 Burqu' 18000: cortex types

N
2478
5014
5015
1037
1000

Table 3.89 Burqu' 18000: total assemblage count

N
2132
1500
9231
FL23e-1
BL23e-2
FL24e-3
BL22e-1
BL32e-2
BL25e-3
BL02elet-1
BL02elet-2
BL02elet-3
BL01 fragment
BL01 form rejuvenation
BL01 inter platform rejuvenation
Q223
Q223 shot
Q000 tablet

906a00

Table 3.90 Burqu' 18000: artefact types – core reduction

Blank type
Blank
Blank/bladelet
Spall
Wool blank type
Blank
Blank/bladelet
Spall
Chip
Blank

Table 3.91 Burqu' 18000: blank type utilization

More type	
10.53	Coating platform
11.53	Exfol (amorphous)
15.32	Single-of-orientation
13.6	Isoidal
1.0	One-on-flake
0.0	Opposed platform
3.4	Single platform
30.5	Fluted piece
<hr/>	
More dimensions	
Width	mm
Thickness	

Table 3.92 Burqu' 18000: core types

Part type
Compression
38.00x
D10.00
F5.00
30.00
30.00 plain
30.00 uniform\filliform
Blank dimensions
Width
Thickness
Butt width
Butt thickness
Bladelet length
Bladelet width
Bladelet thickness
Bladelet butt width
Bladelet butt thickness

Table 3.93 Burqu' 18000: butt types

Core reduction methods

The sample of cores belonging to the Burqu' 18000 assemblage was very small and fragmentary, providing relatively few cores that could be assigned to type (Table 3.92; Fig. 3.50), but the distribution of the various core types shows a pattern reminiscent of other Burqu' core samples. The sample is dominated by single platform and change-of-orientation core types. Cores-on-flakes and opposed platform cores are absent and the number of splintered pieces is quite small, showing that, as at Burqu' 11000, 27000 and 20000, the use of the bipolar-on-anvil technique at Burqu' 18000 was relatively limited. Cores exhibiting blade/bladelet scars (21.1%) show a proportion equal to that of the Burqu' 02000 assemblage. The presence of a significant number of unworked bladelets made on comparatively good raw materials, as well as the presence of a finely made bladelet core (collected from the surface), suggest features of a residual Epi-Palaeolithic industry that pre-dated the reuse of the site during the Late Neolithic/Chalcolithic period. A relatively high percentage of the cores (68.4%) can be defined as exhausted. In spite of the relatively large average core dimensions (skewed by the presence of a few atypical examples), 63.2% of the cores were discarded for their diminutive size, with step scars ruining a further 26.3%; a moderate percentage (10.5%) had become overly obtuse. These features correspond well with other Burqu' assemblages, particularly that of Site 20000.

Blank variables

In common with the samples described above for other Burqu' assemblages, fully cortical butts are the dominant butt type (Table 3.93). Plain butts form a more significant percentage of the Burqu' 18000 sample at the expense of faceted examples when compared with other Burqu' assemblages; the proportion of the former is closer to those of sites outside the Burqu' cluster: Late Neolithic Dhuweila, Jebel Naja and Mahfour al-Ruweishid. The presence of a few punctiform butts appears to be linked to tool and debitage forms representing a residual Epi-Palaeolithic industry, but this diminutive and well-prepared butt type was also noted for the Burqu' 02000 assemblage, where it was associated with the production of bladelets pertaining to the Late Neolithic occupation of the site. In spite of a relatively low percentage of butt edge lips (11.0%) (a feature no doubt attributable to the high percentage of cortical butts in the sample), a high percentage of diffuse ventral bulbs (82.0%) implies the use of a softer hammer during core reduction. This feature, noted to a lesser degree for the 02000 assemblage, is certainly attributable to the presence of the bladelets in the 18000 assemblage, which form a significant portion of the total blanks. Average blank dimensions are comparatively small and most closely parallel those from the Burqu' 02000 assemblage.

Scar pattern

81.00 Directional

6.00 ex

28.00 sed

0.00 al

58.00 Directional

Table 3.94 Burqu' 18000: dorsal scar patterns

<i>Mool type</i>
A174whead
B155n
S654r
Biface
B21orator
A16ch
D89iculate
T799eation
B8123ched
B122e esquillée
M52olith
T00000

Table 3.95 Burqu' 18000: major tool groups: absolute and relative counts

The dorsal scar patterns (Table 3.94) show that unidirectional knapping was predominant, as noted across all of the samples considered in the present analysis. Bidirectional scarring is comparatively low, and the sample shows instead a greater percentage of dorsal scars crossed at 90°. The latter corresponds to the use of the change-of-orientation method and is consistent with the significant presence of this core type in the Burqu' 18000 assemblage.

Tool typology

The tool sample from Burqu' 18000 is dominated by simple retouched pieces and scrapers, showing a distribution most similar to that of Burqu' site 20000 (Tables 3.95 and 3.96; Fig. 3.51). Arrowheads and burins, which help to define other assemblages in the Burqu' area, are rare. The presence of a possible irregular Badia point and one possible transverse arrowhead provide alternative possibilities for dates either early or late in the Late Neolithic sequence respectively. The relative abundance of tabular scrapers, which become more common during the later phases at Burqu' 27000, would seem to agree with a later chronological position. Many of the examples from Burqu' 18000 are fragmentary and represent the use of quite thin tabular flake blanks. The presence of a few examples exhibiting broad faceted butts support the suggestion of a date similar to that noted for the final Burqu' 27000 assemblage from the end of the Late Neolithic or into the Chalcolithic period. One other scraper, a very broad and heavily resharpened example, is morphologically similar to a truncation belonging to Late Neolithic Dhuweila, but exhibits extensive scraper polish on the dorsal face opposite inverse scraper retouch (Betts *et al.* 1998, 117, fig. 4.32, no. 3). There are a number of bifacially worked pieces, several of which can be characterized as tile knives. A significant number of borers, occasionally double borers made on robust flakes, appear in all phases. These tools, together with the virtual absence of drill bits on burin spalls, appear consistent with a later date. Potentially pre-Neolithic material comes in the form of a finely backed bladelet collected from the same Phase 3 context (115) as the possible Badia point fragment. The appearance of this tool, along with a notched blade segment exhibiting a microburin scar and a well-

prepared change-of-orientation bladelet core belonging to the assemblage, appear to correspond to a residual Epi-Palaeolithic element similar to that noted for Burqu' 35000. Artefacts defined as pièces esquillées (distinguished from splintered piece cores on the basis of fine scarring on opposite ends of the tool and the use of regular blank segments as the tool blank) may also correspond to this earlier feature of the assemblage since such tools do not feature in other assemblages from around the lake.

<i>Tool type</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>++</i>
<i>Arrowhead</i>						
Badia	0	0	1	0	0	0
Transverse	0	0	0	1	0	0
<i>Burin</i>						
On truncation	0	0	1	0	0	0
On break	0	0	1	1	0	0
<i>Scraper</i>						
Tabular	7	1	3	7	1	0
End	2	2	1	2	0	0
Double end	0	0	1	0	0	0
Side	1	0	0	1	0	1
<i>Biface</i>						
Flake	0	0	1	0	0	0
Tabular (knife)	0	0	2	2	0	1
<i>Perforator</i>						
Pick	0	0	0	1	0	0
Borer on blade/bladelet	0	0	1	1	0	0
Borer on flake	4	2	3	3	1	0
Drill	0	0	1	0	0	0
<i>Notch</i>						
On pebble	0	0	0	0	1	0
On blade/bladelet	1	0	1	1	0	0
On flake	2	2	1	0	0	0
<i>Denticulate</i>						
On pebble	1	0	0	0	0	0
On flake	8	1	4	2	1	0
Tabular	1	0	0	0	0	0
<i>Truncation</i>						
On blade/bladelet	0	4	1	0	1	0
On flake	3	0	5	5	1	0
Double	6	1	0	0	0	0
Retouch						
On blade/bladelet	4	0	2	4	1	0
On flake	12	4	10	8	4	0
On chip	0	0	1	1	1	0
On spall	0	0	0	1	0	0
Miscellaneous	4	1	2	5	2	0
Splintered piece	5	1	3	2	1	0
<i>Microlith</i>						
Backed bladelet	0	0	1	0	0	0

Table 3.96 Burqu' 18000: tool types: absolute counts by phase

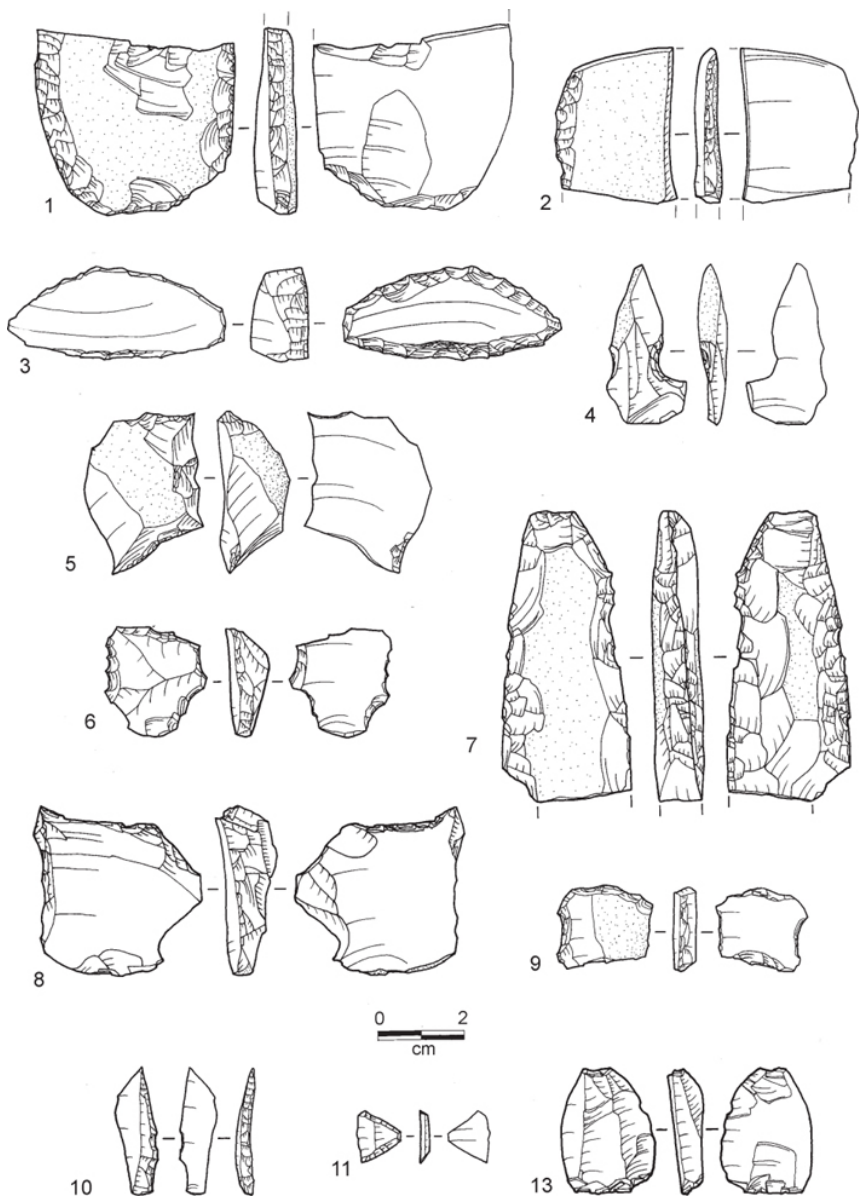


Figure 3.51 Burqu' 18000: chipped stone. 1, 2. Tabular scrapers; 3. End scraper; 4. Notch on flake; 5. Truncation on flake; 6. Denticulate on flake; 7. Tabular knife; 8. Borer on flake; 9. End scraper; 10. Backed bladelet; 11. Transverse arrowhead; 13. Piece esquillee

Faunal remains

Faunal remains were recovered from all phases of the excavation at Burqu' 1800

(Tables 3.97 and 3.98). A total of 1914 bone fragments was recovered, but, as indicated in Table 3.98, only 64 (3.3%) of these were identifiable.

Discussion

Overall, gazelle are dominant, but sheep/goat are present throughout the stratigraphic sequence (Table 3.99). The assemblage most closely resembles Burqu' 35000 and is markedly dissimilar in proportions to Burqu' 03000 or 27000. There are no observed differences in taxa representation throughout the occupation sequence, but the upper phases (Phases 3–4) have far larger samples than the lower ones (Phases 1–2). The unusual presence of ostrich in Phase 3 is interesting. It might be relevant that ostrich egg shell fragments were found in Phase 2, although these were recovered from levels stratified below the wall retaining the occupation deposits within which the ostrich bone was found.

Summary

Burqu' 18000 appears different from the other sites surrounding the lake. The massive stone terrace is unusual and, while the structures built on it are of the simple drystone walling found at all the other sites, there was no evidence of the upright slabs that are a mark of the prehistoric sites. The terrace forms the foundations of the site and thus dates from the earliest phase of construction. The presence of coarse ware sherds from the earliest phase onwards suggests a later date than the other sites, although the other special finds, with the exception of the glass, could belong to any period from prehistory to the recent past. The glass fragments occurred only in the upper two phases. The lithic industry is not strongly diagnostic, but the tabular scrapers appear consistent with a later prehistoric date for the earliest four phases at the site. The suggestion that many of the tabular scrapers may have been imported (see 'Raw materials', above) is also more consistent with a later date. The chipped stone, as the main diagnostic element, may indicate a date in the Chalcolithic. The sherds are, for the most part, locally made within the *harra*, but such hand-made forms continued in production from prehistory into modern times. No Late Neolithic pottery has been recovered from other Burqu' sites, but coarse ware sherds were found at Late Neolithic Dhuweila 2 (Betts *et al.* 1998). The upper phases at 18000, and certainly Phase 5, contain deposits dating probably to the time of the occupation of the Qasr. It is interesting to note that the faunal remains contain a smaller proportion of sheep/goat than on earlier sites, and it is tempting to suggest that this could be the result of an intensification of herding practices which reduced the number of animals killed for meat.

Taxa and skeletal parts

~~Skeletal~~ parts

Phase 1

~~435~~ fragments: 2 gazelle bones (pubis and astragalus), hare metatarsal, small bird carpometacarpal

~~136~~ fragment: sheep/goat petrous

~~130~~ fragment: sheep/goat/gazelle second phalanx

~~142~~ fragment: hare metapodial

Phase 2

~~424~~ fragments: 3 gazelle bones (second phalanx, proximal radius, radius shaft), medium bird distal humerus

~~127~~ fragment: gazelle third phalanx

~~231~~ fragments: sheep/goat third phalanx (probably sheep), hare distal tibia

Phase 3

~~109~~ fragments: 2 equid tooth fragments, 9 gazelle bones (proximal radius, distal femur $\times 2$, distal tibia, astragalus $\times 2$, first phalanx)

~~215~~ fragments: gazelle proximal tibia, hare first phalanx

~~317~~ fragments: gazelle ischium, gazelle third phalanx, large bird (ostrich) distal femur

~~318~~ fragments: gazelle first phalanx, sheep/goat/gazelle third phalanx, hare distal tibia

~~222~~ fragments: equid tooth fragments (1 may be *E. hemionus*)

Phase 4

~~206~~ fragments: gazelle second phalanx, sheep/goat/gazelle proximal humerus

~~207~~ fragments: 19 gazelle fragments (atlas, scapula, proximal radius, distal humerus, proximal tibia, tibia shaft, calcaneum $\times 2$, metapodial, mandible fragment $\times 2$, maxilla tooth, first phalanx, carpal $\times 2$, astragalus, sesamoid); 2 equid fragments (second phalanx, carpal/tarsal)

~~308~~ fragments: gazelle first phalanx $\times 2$, radius shaft

~~212~~ fragments: gazelle second phalanx, sheep/goat first phalanx

Phase 5

~~102~~ fragment: small bird coracoid

<i>Level</i>	<i>Context</i>	<i>Numbers</i>		<i>Weights</i>			<i>Total weight</i>
		<i>Non-IDs</i>	<i>IDs</i>	<i>Total numbers</i>	<i>Non-IDs</i>	<i>IDs</i>	
5	101	56	0	56	29	0	29
5	102	22	1	23	19	0.3	19
5	103	18	0	18	11	0	11
4	104	17	0	17	10	0	10
4	105	2	0	2	1	0	1
4	106	61	2	63	19	4	23
4	107	358	22	380	243	92	335
4	108	14	3	17	10	13	23
3	109	110	9	119	50	19	69
4	110	9	0	9	5	0	5
5	111	5	0	5	2	0	2
4	112	46	2	48	19	1	20
3	115	21	2	23	15	3	18
3	116	19	0	19	10	0	10
3	117	303	3	306	78	9	87
3	118	42	3	45	15	4	19
3	122	82	2	84	75	37	112
2	124	70	4	74	34	4	38
2	127	116	1	117	40	1	41
2	128	41	0	41	16	0	16
2	129	13	0	13	15	0	15
2	130	3	0	3	3	0	3
2	131	70	2	72	43	3	46
1	135	42	4	46	20	6	26
1	136	71	1	72	17	3	20
1	138	13	0	13	6	0	6
1	139	20	1	21	5	0.5	5.5
1	140	62	0	62	20	0	20
1	142	10	1	11	2	0	2
1	144	31	0	31	9	0	9
1	145	5	0	5	1	0	1
1	146	26	0	26	8	0	8
1	147	40	0	40	13	0	13
1	148	9	0	9	2	0	2
1	149	24	0	24	7	0	7
Total		1851	63	1914			

Table 3.97 Burqu' 18000: the counts and weights of identifiable v. unidentifiable animal bones by phase. identifiable bones are shown in bold in right hand columns.

	Phase					<i>Total</i>
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	
Equid	0	0	4	2	0	6
Sheep/goat/gazelle	0	0	1	1	0	2
Sheep/goat	2	1	0	1	0	4
Gazelle	2	4	13	24	0	43
Dog/wolf	0	0	0	0	0	0
Hare	2	1	2	0	0	5
Hedgehog	0	0	0	0	0	0
<i>Jaculus</i>	0	0	0	0	0	0
Bird	1	1	1	0	1	4
Total	7	7	21	28	1	64

Table 3.98 Burqu' 18000: identifiable animal remains (NISPs per phase of occupation)

<i>Percentage</i>
Equid
Sheep/goat/gazelle
Sheep/goat
Gazelle
Dog/wolf
Hare
Bird
Total

Table 3.99 Burqu' 18000: relative proportions of all taxa (% NISP)

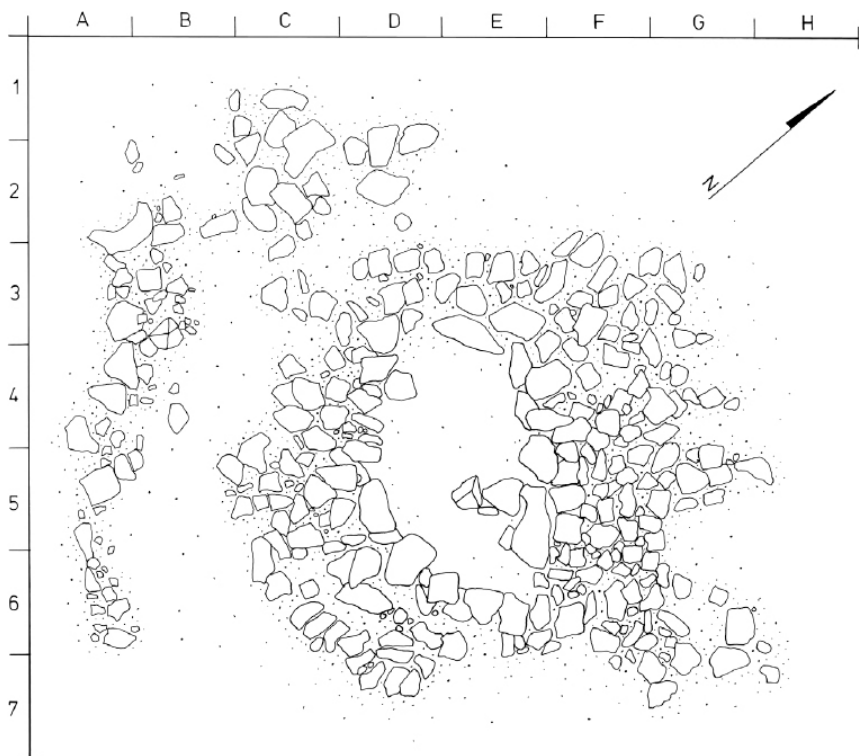


Figure 3.52 Burqu' 28000: plan

Site 28000

Site 28000 lies on level ground roughly a kilometre east of the Qasr. The site originally appeared as a low pile of large blocks surrounded by a circular spread of smaller stones, some of which seemed to have been deliberately placed. It was chosen for excavation because it seemed possible that the cairn marked a burial, possibly of a historic period. Removal of the larger slabs on top of the mound revealed what appeared to be a main burial chamber and a subsidiary grave to the side (Fig. 3.52). Unfortunately, no remains were found and there were no apparent traces of a cut into bedrock. It is unclear whether the site was intended as a grave, or if it was ever used for this purpose. As there was no cut into bedrock it is possible that remains of an inhumation without accompanying non-organic artefacts might have entirely disappeared as a result of weathering and animal or insect activity.

Site 29000

Site 29000 lies on slightly rising ground to the south of the lake, about half a kilometre from the shoreline. As with Burqu' 28000, the site was initially thought to be a grave of the historical periods. Part of the site has recently been robbed

out, uncovering a circular pit approximately 0.75 m across and 0.80 m deep. The top of the cut was ringed by carefully laid stones (Fig. 3.53). Immediately beside this pit was a small, partially corbelled cairn which appeared to be a similar pit, as yet undisturbed and retaining its original stone sealing (Fig. 3.54). Several well-laid basalt slabs were removed, uncovering a large capstone, under which was a circular cut similar to the robbed-out pit beside it (Fig. 3.55). However, the fill of the cut contained no traces of artefacts or bones, and the cut itself was considerably shallower than the one adjacent. It was impossible to determine the function of the structure, although care had clearly been taken in its construction. It seemed too small and of an unusual shape for a burial. One possibility might be that it was intended as a long-term storage pit for use by regular seasonal visitors to the lake.

Site	Context
0800	
3000	10; 112; 207; 208
2700	18; 124; 132; 133; 136; 140; 142; 209; 220; 223; 224; 226; 233; 235; 237; 238
Table 3.100 Burqu': sites and contexts from which charcoal was extracted for botanical analysis	

Botanical remains

Although conditions were difficult, an attempt was made to sample each site for charred plant remains. A total of 23 samples was collected from hearth deposits and processed by bucket flotation on site. Table 3.100 shows the contexts from which samples were obtained.

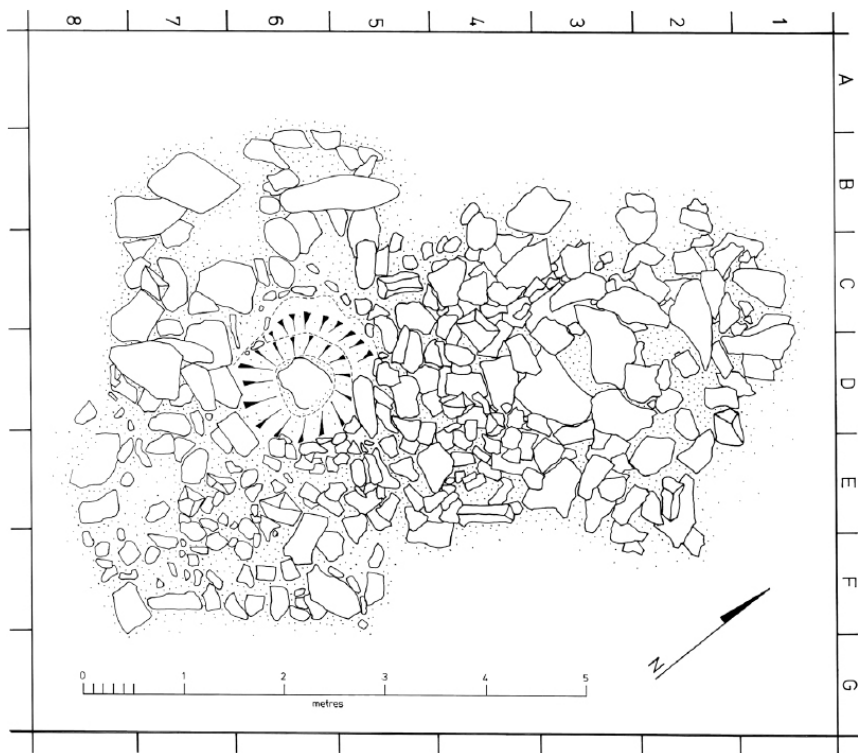


Figure 3.53 Burqu' 29000: general plan after initial cleaning

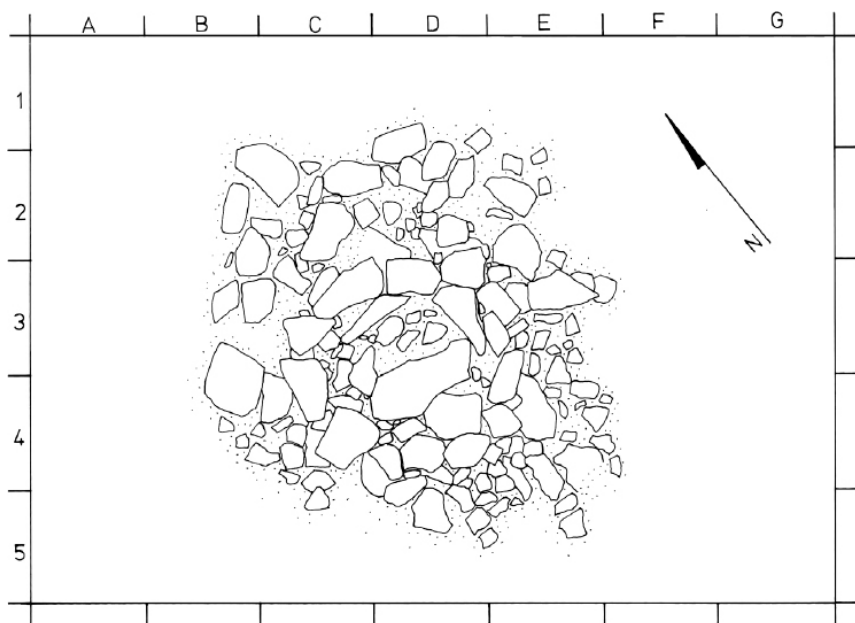


Figure 3.54 Burqu' 29000: detail of covering of pit

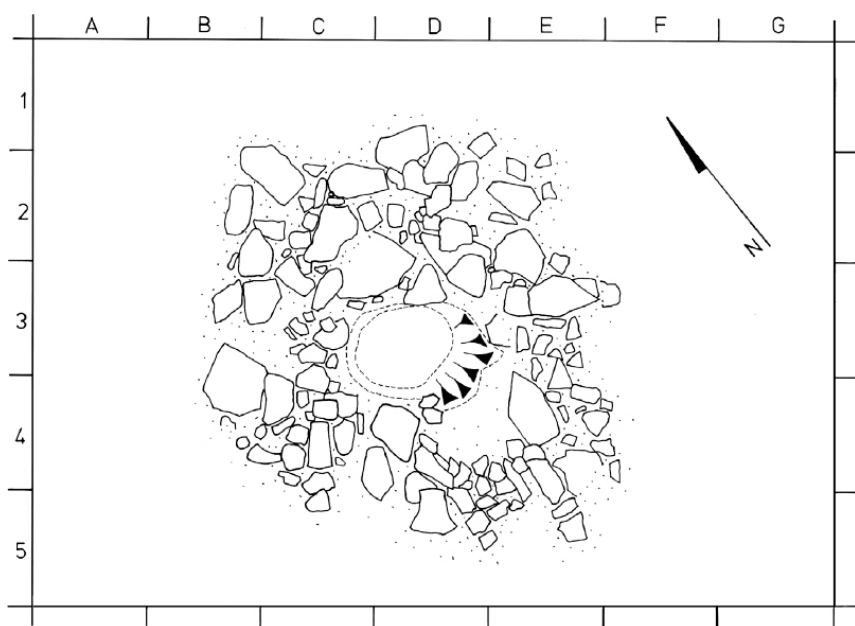


Figure 3.55 Burqu' 29000: pit after excavation

The samples were processed by George Willcox and Hugues Pessin (Archéorient CNRS UMR 5133, Jalès). No seeds were found in any of the samples but identification of the charcoal was possible. Only one taxon was identified and this appeared repeatedly throughout many of the samples. This was a member of the Chenopodiaceae family, which in this case represents woody desert shrubs. The charcoal analyses are presented in Table 3.101. The results suggest that the shrubs were being used for fuel, as is common in the region today, in the absence of larger bushes or trees. The desert shrubs burn easily when dry, although they are rapidly consumed and a large amount needs to be collected if a fire is to be kept going for long periods of time. Based on negative evidence, it appears that the inhabitants of the sites were not using domesticated plants. The absence of seeds of any kind in the samples makes assessment of seasonality impossible.

[illegible]

Table 3.101 Burqu' sites: identified botanical samples from charcoals

4. Excavations at Mahfour al-Ruweishid

A. Betts, C. McCartney, H. Pessin and G. Willcox

Despite extensive survey through the *hamad* to the east and south of Burqu', prehistoric sites seemed largely to consist of flint scatters without associated structures. Identifiable Late Neolithic sites were of the 'burin Neolithic' variety: scatters of flints along wadis with high proportions of concave truncation burins in the artefact assemblage. The one exception was the site of Mahfour al-Ruweishid, which was located on a mudflat in Wadi Ruweishid a few kilometres north of the modern dam at Feydha. The site consists of a rough circle of fossiliferous limestone blocks of varying size, open on the eastern side (Fig. 4.1). Other ancient corrals were located along a low limestone ridge nearby. Two trenches were laid out: Trench 100 was 5 m \times 3 m in size and was set across the southern sector of the enclosure (Figs 4.2–4.3), while Trench 200 was 2 m \times 3 m in size and was placed just outside the eastern opening. In Trench 100, the enclosure wall overlay a rough stone pavement, while in the trench's north-eastern corner a shallow pit filled with fire-cracked and blackened stones was cut into bedrock. Trench 2 contained some small ephemeral stone features and another pit filled with fire-cracked stones.

Dating

One radiocarbon date, 6085 \pm 67 BP (cal. BC 5212–4841; Wk-20219), was obtained for the site from the ash (202) within a fire pit (203). It clearly indicates that Mahfour al-Ruweishid is substantially later than the dated sites around the lake at Burqu'. However, since dates were not obtained for all levels at the Burqu' sites, particularly in the cases of those that appear on typological grounds to be later, the inference cannot be drawn from the date obtained here that the lakeshore was gradually abandoned in favour of the steppe.

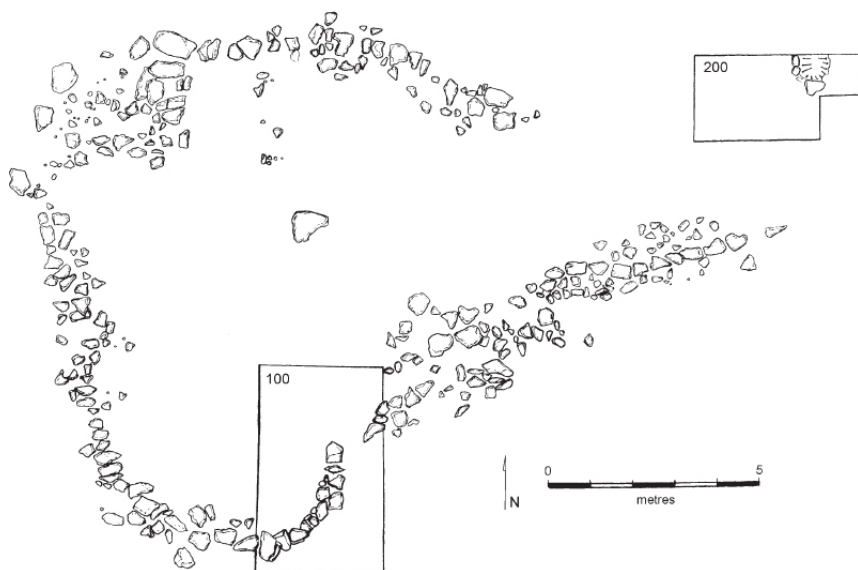


Figure 4.1 Mahfour al-Ruweishid: general site plan



Figure 4.2 Mahfour al-Ruweishid: 100 Level 2 plan

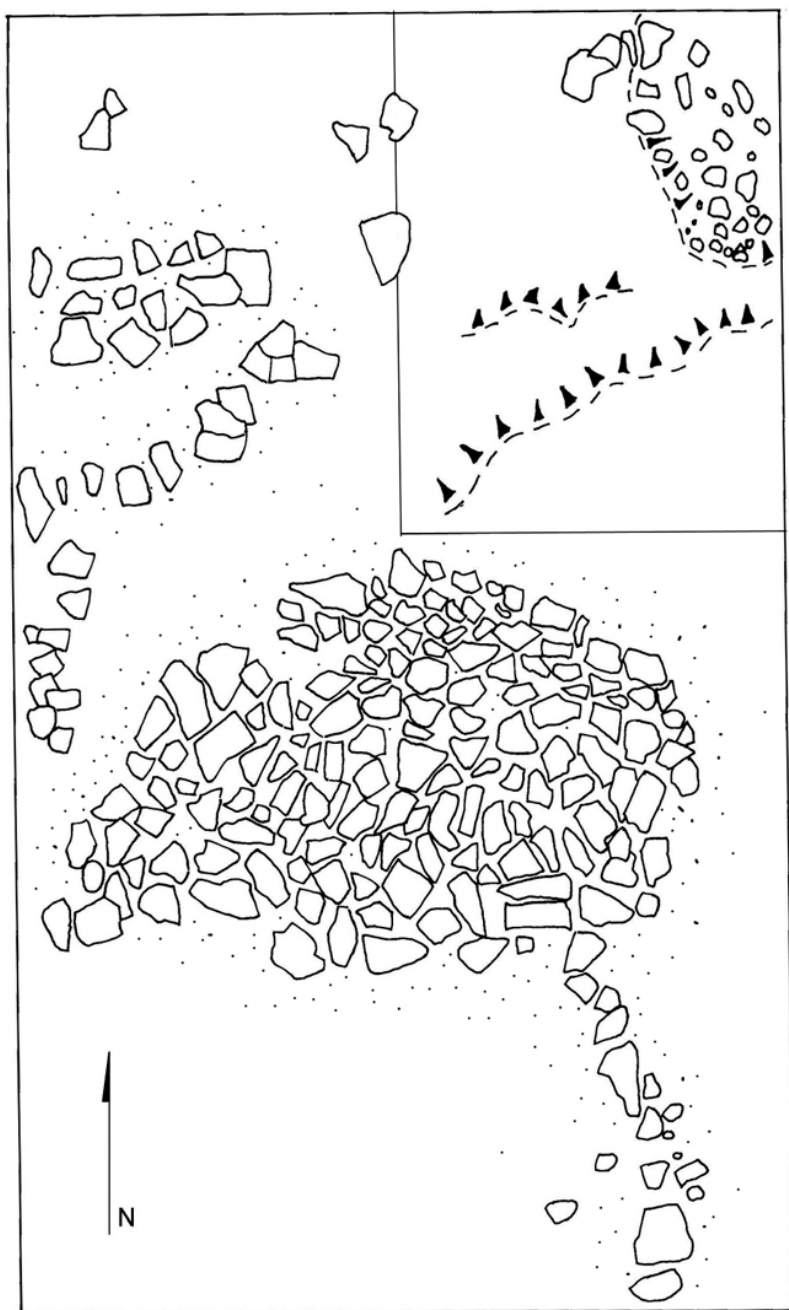


Figure 4.3 Mahfour al-Ruweishid: 100 Level 3 plan

<i>Description</i>	
100	
<i>Level 3</i>	
100	soil, compacted silt
<i>Level 2</i>	
100	se light brown sandy silt and fine gravel
100	se light brown sandy silt and medium gravel
100	tion of main enclosure wall, irregular limestone blocks
<i>Level 1</i>	
100	regular stone pavement, limestone cobbles
005	compact light brown sandy silt with limestone chunks, internal
006	friable sandy silt with limestone chunks, external
007	compact light brown sandy silt, below 105
007	07 but stratified below 104
200	
<i>Level 2</i>	
200	soil, compacted silt
<i>Level 1</i>	
002	friable mix of ash and silt
002	pit cut into bedrock, filled with small fire blackened stones, below 202
004	compact light brown sandy silt above bedrock

Table 4.1 Mahfour al-Ruweishid: contexts by level

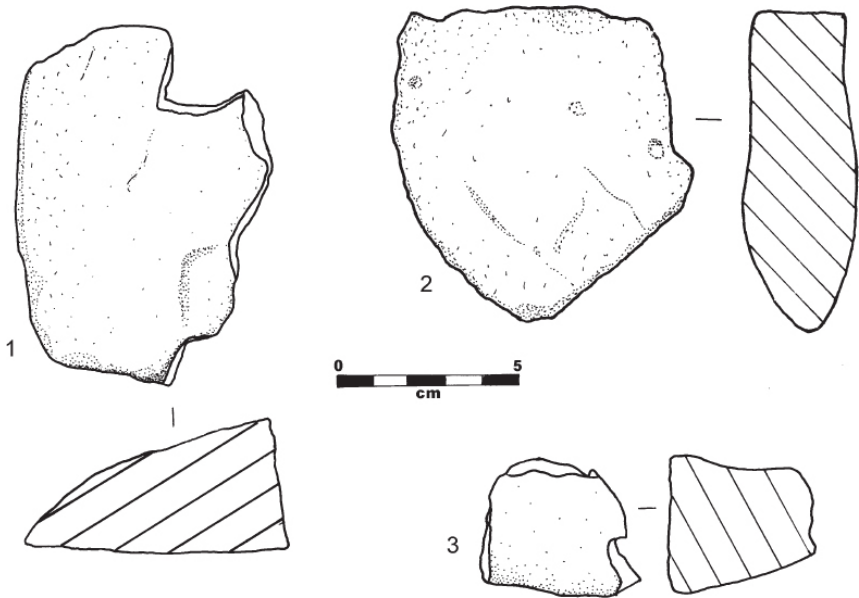


Figure 4.4. Mahfour al-Ruweishid: ground stone

Stratigraphy

The topsoil contained a concentration of flint artefacts, including a transverse arrowhead. Level 2 was composed of loose light brown sandy soil containing a mixture of thin occupation deposits mixed with windblown sand. Tumble from the wall lay across the excavated area and there were traces of thin internal stone features. A fragment of basalt was also recovered. The pavement of Level 3 lay across the centre of the trench, underlying the wall. In the north-east corner was a shallow depression scooped into bedrock and partially filled with small blackened and fire-cracked stones.

	1	2	3	4	5	6
Cores	3.00	15.00	18.00	3.00	8.00	4.00
%	5.88	29.41	35.29	5.88	15.69	7.84
Blanks	8.00	34.00	27.00	13.00	6.00	12.00
%	8.00	34.00	27.00	13.00	6.00	12.00
Total	11.00	49.00	45.00	16.00	14.00	16.00
%	7.28	32.45	29.80	10.60	9.27	10.60

Table 4.2 Mahfour al-Ruweishid: raw material quality

	Tabular	Cobble	Wadi- pebble	Patina	None
Cores	7.00	22.00	1.00	3.00	5.00
%	18.42	57.89	2.63	7.89	13.16
Blanks	6.00	43.00	0.00	8.00	43.00
%	6.00	43.00	0.00	8.00	43.00

Table 4.3 Mahfour al-Ruweishid: cortex types

N
2452s
661s and core trimming elements
5519s
551s
302a01

Table 4.4 Mahfour al-Ruweishid: total assemblage count

200

The main occupation level, Level 2, contained clusters of small limestone chunks apparently indicating irregular internal features. Below this lay an irregular bedrock surface with a shallow fire pit cut into the north-east corner.

Phasing

100

++ Unstratified surface collections
Level 3. Topsoil, compacted silt
Level 2. Loose light brown silty occupation deposits, wall
Level 1. Compact brown silty occupation deposits, pavement and pit with fire-cracked stones

200

++ Unstratified surface collections
Level 2. Topsoil, compacted silt
Level 1. Grey friable mix of ash and silt, pit with fire-cracked stones
For contexts by level, see Table 4.1.

<i>M</i>
B91p
C355k
Spk3l
B193e-1
B2130-2
B197-3
B10de-1
B12de-2
B10de-3
B10delet-1
B18delet-2
B17delet-3
B96B fragment
P186 form rejuvenation
Sp10 ntered platform rejuvenation
Cr3 ted
Q00 rshot
Q00 tablet
6718 s and core fragment
T60a00

Table 4.5 Mahfour al-Ruweishid: artefact types – core reduction

<i>Blank type</i>
B5345
B5a08 /bladelet
Sp47l
<i>Tool blank type</i>
B5164
B4555 /bladelet
Sp00l
V1ip3
Q00er

Table 4.6 Mahfour al-Ruweishid: blank type utilization

Special finds

The only special finds were three small fragments of basalt, each with a smoothed surface, which appeared to be fragments of rubbers (Fig. 4.4). The site lies within the limestone *hamad* and the basalt must have been transported at least 15 km from the basalt *harra* to the west.

Chipped stone

Raw materials

The raw material used at Mahfour al-Ruweishid comprised a variety of types including fine grey and creamy tabular flint, coarse grey chert with white flecks and fine-grained flint with a creamy white patina and a pinkish tint (Table 4.2). The occupants of the site were using a slightly wider selection of raw materials than those present at Burqu'.

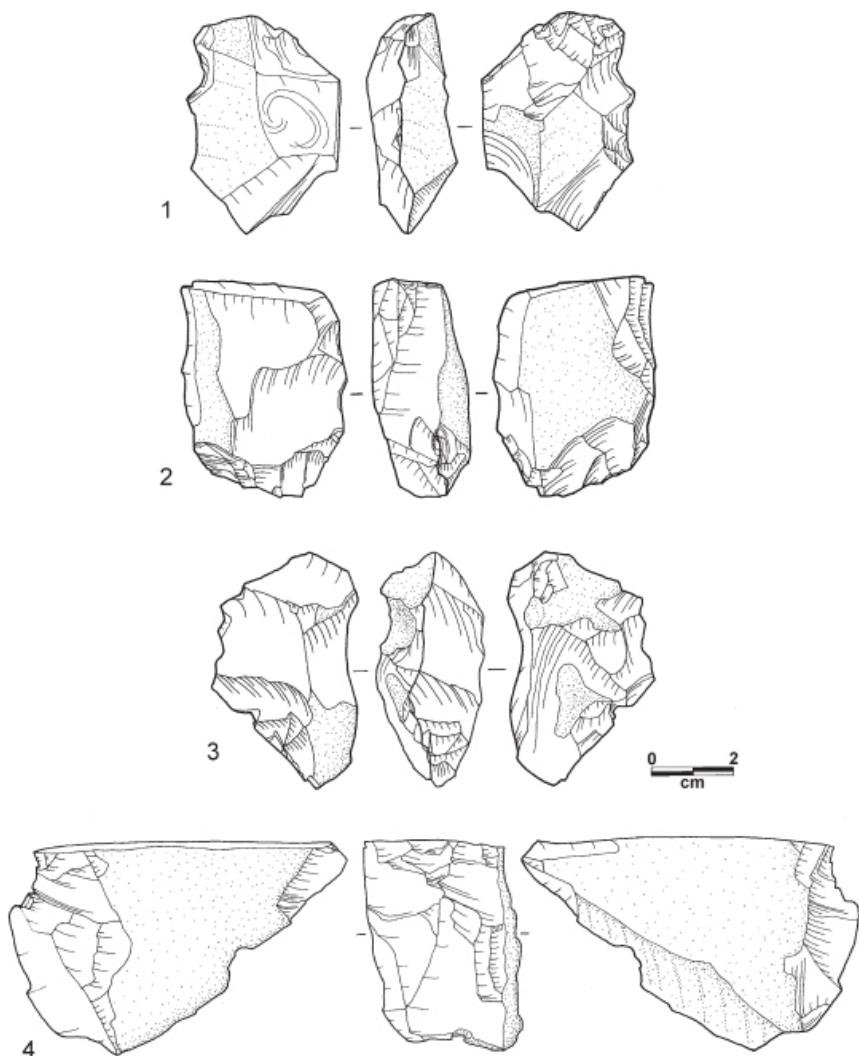


Figure 4.5 Mahfour al-Ruweishid: chipped stone. 1. Mixed (amorphous) core; 2. Opposed platform core; 3. Mixed (amorphous) core; 4. Single platform core

Good-quality materials (Types 1–3) made up a relatively high proportion of the assemblage (69.5% of the total core and blank samples). The selection of good-quality raw materials here, as at Jebel Naja, throws into yet sharper relief the comparatively poor-quality raw materials used on the sites immediately adjacent to the lake at Burqu', and suggests that localities like Mahfour al-Ruweishid may have been selected in part for the presence of good-quality raw materials. The shifts in core technology associated with the transition from the PPNB to the Late Neolithic, therefore, clearly cannot be uniformly defined on the basis of the use of

inferior-quality cherts. In spite of the comparatively high quality of the materials employed, the percentages of crushed butts (1.0%) or butts exhibiting compression rings (14.0%) are low. That this feature may be a better reflection of the type of hammer employed than the type of material utilized is noted below in the discussion of bulb types.

Weathered cobbles dominate the samples of cores and blanks belonging to the Mahfour assemblage, but a significant percentage of the materials used can be characterized as tabular (Table 4.3). This feature is most strongly exhibited by the core sample, which shows an even greater percentage of tabular material than that exhibited by the assemblage from Jebel Naja. The lower percentage of tabular blanks is no doubt accounted for by the greater numbers of fully non-cortical examples in this sample.

Core type
Alternating platform
Amorphous
Change-of-orientation
Coidal
Con-flake
Exposed platform
Flake platform
Fluted piece
Blank dimensions
Width
Thickness

Table 4.7 Mahfour al-Ruweishid: core types

Butt type
Compression
Conc
Cordal
Cord
Flat
Not plain
Blank dimensions
Width
Thickness
Width
Thickness

Table 4.8 Mahfour al-Ruweishid: butt types

Artefact counts

The major artefact categories are all represented in the Mahfour assemblage in percentages approximately similar to those shown by the majority of the Burqu’ site assemblages (Tables 4.4 and 4.5). The presence of cores and core trimming elements, as well as the large amount of discarded debris, shows the local manufacture of tools and tool blanks. The ratio of blanks to cores (4:2) is slightly

higher than that of assemblages such as Burqu' 11000, though this is perhaps a feature of the overall simplicity of the core technology generally.

The distribution of the various artefact types listed in Table 4.5 shows a lower than usual percentage of chips and fewer core trimming elements than seen elsewhere. Together these features suggest a comparatively simple organization in the core technology, employing little core preparation or maintenance. Blanks are again dominated by cortical examples for both flakes and the small blade sample, though bladelets were more frequently non-cortical. It is likely that these bladelets were simply manufactured during the later stages of core reduction as core size dwindled, rather than representing any kind of deliberate blank production strategy.

Both blanks and tools show that the preferred type of blank at Mahfour was the flake (Table 4.6; Fig. 4.5). This feature of the assemblage is characteristic also of the Burqu' assemblages and is consistent with the attribution of the assemblage to the Late Neolithic. As in the assemblages of Burqu' 27000, 11000 and 20000, discussed in Chapter 3, burin spalls are almost entirely absent. The percentage of tools made on chips is somewhat higher than in the majority of the Burqu' assemblages, but still well below that of the Burqu' 02000 assemblage.

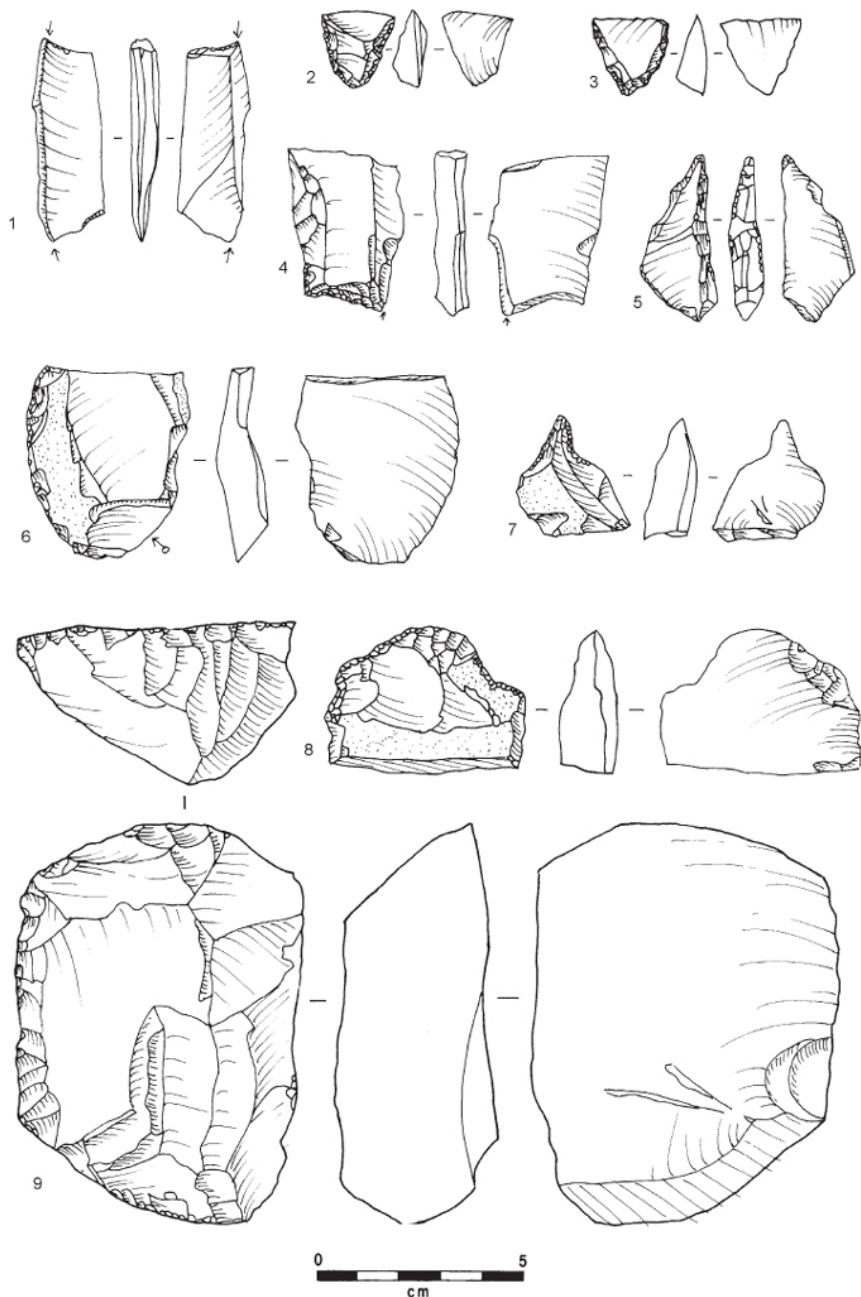


Figure 4.6 Mahfour al-Ruweishid: chipped stone. 1. Multiple mixed burin; 2, 3. Transverse arrowheads; 4. Concave truncation burin; 5. Borer on blade; 6, 8. Tabular scrapers; 7. Borer on flake; 9. Massive end scraper

Core reduction methods

The core sample is dominated by irregular amorphous examples and a significant number of change-of-orientation cores (Table 4.7). The prominence of these core types, along with the relative paucity of alternating platform cores, compares well with the core sample belonging to Jebel Naja. The Mahfour core sample, however, has very few opposed platform cores and a greater dependence on single platform cores, corresponding in this respect with the Burqu’ cluster sites, particularly the assemblages of Sites 27000, 11000 and 20000. The very low percentage of cores made on flakes is similar to the pattern present in the assemblages of both Jebel Naja and Burqu’ 20000. Average core dimensions are comparatively large, and compare best to those of the Jebel Naja assemblage. It is likely that both core size and the methods used for core reduction are at least partly dependant on the nature of the raw materials employed, which are similar at both Mahfour and Jebel Naja. Very few of the Mahfour cores exhibited blade/bladelet scars (only 5.3%, the smallest proportion of all samples considered in the present analysis); this corresponds with the low numbers of blades/bladelets produced. The majority of the cores belonging to the Mahfour assemblage, however, can be considered to be exhausted (79.0%), as is also the case in several of the Burqu’ assemblages. The percentage of cores discarded because of step scars is comparatively high (31.6%), approaching that of the Jebel Naja assemblage. A low but significant percentage (7.9%) was discarded when core striking platforms obtained an overly obtuse angle, and a surprisingly significant percentage (13.2%) was discarded owing to raw material flaws, contrasting with the generally good quality of material exhibited by the assemblage.

Scar pattern
Unidirectional
60.0%
60.0%
24.0%
Radial
10.0%
Unidirectional

Table 4.9 Mahfour al-Ruweishid: dorsal scar patterns

Tool type
Arrowhead
Burin
37.0%
Tile knife
60.0%
Denticulate
0.0%
Other
14.0%
Retouched pieces
35.0%

Table 4.10 Mahfour al-Ruweishid: major tool groups

Blank variables

The sample of butt types (Table 4.8) is characterized by a greater percentage of

plain butts than in either the Burqu' assemblages or that from Jebel Naja. This reflects not only a lower total percentage of faceted butt types but also a somewhat lower percentage of fully cortical butts. These features of the blank sample imply simple but consistent preparation of core striking platforms. Average blank dimensions showed that the comparatively thick flakes produced at Mahfour were short and squat in nature, while the average butt width far exceeds the same statistic shown for other assemblages.

Bulb types (18.0% salient versus 82.0% diffuse), like the low percentage of butt deformation noted above, argue for the use of a softer hammer for the production of flake blanks, in contrast to the hard-hammer characteristics generally seen in other assemblages.

The dorsal scar patterns for the Mahfour assemblage show the strong dominance of unidirectional knapping methods also seen in the Burqu' assemblages, particularly that of Burqu 20000, as well as at Jebel Naja (Table 4.9). Scars crossed at 90° represent the second most prevalent pattern as with both the Burqu' and Jebel Naja assemblages, while the paucity of fully cortical examples reflects differences in the types of raw materials employed here and in the Burqu' area.

<i>Tool type</i>	<i>100</i>			<i>200</i>		
	<i>1</i>	<i>2</i>	<i>3</i>	<i>1</i>	<i>2</i>	<i>+</i>
<i>Arrowhead</i>						
Nizzanim	0	1	0	0	0	0
Transverse	0	1	1	0	0	0
<i>Burin</i>						
On break	1	1	0	0	0	0
Truncation	0	2	0	0	0	0
Dihedral	1	0	0	0	0	0
Multiple mixed	0	1	0	0	0	0
<i>Scraper</i>						
Flake, various	1	2	0	0	0	0
End on blade	1	0	0	3	1	2
End, other	0	0	1	1	0	0
Side	1	1	0	0	0	0
Tabular	0	2	0	0	0	0
Broken	0	0	0	0	1	0
<i>Tile knife</i>						
Bifacial knife	0	0	0	0	0	1
<i>Borer</i>						
Borer on blade	1	0	0	0	0	0
Borer on flake	2	2	3	1	0	1
<i>Denticulate</i>						
On blade	1	0	0	0	0	0
On flake	1	0	0	0	0	0
<i>Other</i>						
Various	1	1	0	0	0	0
<i>Retouched piece</i>						
Blade	2	0	0	0	0	0
Flake	2	5	0	0	0	0
Chip	0	1	1	0	0	2
Chunk	1	0	0	0	0	0
Total	16	20	6	5	2	6

Table 4.11 Mahfour al-Ruweishid: retouched pieces

Tool typology

Overall, the site produced very few chipped stone tools. Most of the pieces were small and the tool assemblage was limited (Fig. 4.6), comprising irregular flake scrapers and end scrapers on blades, some fragments of tabular pieces, a small number of burins (some on truncations), a number of borers and two transverse arrowheads (Tables 4.10–4.11). There was also a massive endscraper on a large coarse whitish chert flake.

Typologically, the assemblage fits into the later part of the Burqu' sequence. The most diagnostic tool group, the arrowheads, comprised one Nizzanim point and two transverse arrowheads. The presence of the former suggests that the site may have seen sporadic use over a long period of time, while the transverse arrowheads are more compatible with the radiocarbon date obtained for the site. Truncated pieces and pebble flakes were absent, although the latter may be a phenomenon specific to the Burqu' sites, as they do not occur at al-Hibr and tend to reflect the use of poor-quality raw material immediately adjacent to the lake.

Faunal remains

Faunal remains recovered from the site were highly fragmentary and were not analysed.

Botanical remains

The site was sampled for carbonized plant remains. Three samples were collected from hearth deposits (109, 201, 202) and processed by bucket flotation on site. The samples were processed by George Willcox and Hugues Pessin (Archéorient CNRS UMR 5133, Jalès). No seeds were found in any of the samples, but, as at Burqu', one taxon was identified from the charcoal. This was present in two of the three samples (202, 202); it is a member of the *Chenopodiaceae* family, all of which are desert shrubs.

Summary

The site of Mahfour al-Ruweishid is unusual. Despite extensive survey across the eastern *hamad* no similar sites have been found on open flat ground adjacent to seasonal rainpools. By the Chalcolithic/Early Bronze Age, sites with corrals start to appear in southern Jordan in the wadi systems running down from the upper western rim of the Wadi Sirhan around Bayir (Tarawneh 2007; Betts and Tarawneh 2010). In the *hamad* there are some undated circular stone corrals on wadi slopes that closely resemble the Bayir corrals (see Chapter 6). In general, the appearance of corrals of substantial size in the *badia* appears to be a post-Neolithic phenomenon. Mahfour al-Ruweishid may have been closely linked to Burqu', and possibly represented a later seasonal exploitation of the *hamad* by groups who had been visiting the Burqu' rainpool for many generations.

5. Excavations at Tell al-Hibr

A. Betts and L. Martin

Some sites of the Chalcolithic/Early Bronze (EB) Age are known in both *harra* and *hamad*, but many more may have gone unrecognized for lack of comparative diagnostic material. Chipped stone assemblages are more basic and less archaeologically recognizable than in earlier periods, and pottery, the main chronological indicator on settlement sites, is either absent from steppic sites or of local crude manufacture with few diagnostic forms (e.g. Betts *et al.* 1998, 135, 136, fig. 6.1). Three sites have been assigned to this period on the basis of certain artefacts which have parallels in known assemblages in the Levant.

BDS2314 is a camp site with a mixed scatter of flints and some coarse ware pottery. Among the sherds was a simple form of the wavy ledge handle typical of EBIII/IV assemblages in Palestine (Betts 1984, fig. 7, 17). The second site is 'Maitland's Hillfort', a basalt-capped peak in the south-eastern section of the Jordanian *harra*, close to Qattafi Wells (Maitland 1927). The flat top of the peak is partially covered by a series of corrals. A small number of coarse basalt-tempered sherds, of a kind which could be dated to almost any period from prehistoric to recent, were found there. The flint scatter was limited, apart from two small Neolithic knapping sites, but among the finds near the corrals were two elongated tabular scrapers with faceted platforms typical of the late Chalcolithic/EBI periods in the fertile regions to the west (Betts 1986, 296, fig. 6.7). Neither of these sites does more than indicate possible short-term passage through the *harra*, but the third site, Tell al-Hibr, indicates regular short-term use of a particular location deep within the steppe/desert.

Tell al-Hibr

Map ref. 3653 iv 190233

Tell al-Hibr is a basalt-capped outlier 10 km east of the main basalt massif. It lies just north of the TAP Line a few kilometres from the modern Saudi Arabian border

and comprises a series of peaks with exposed outcrops of limestone and chert on the lower slopes (Fig. 5.1). It is a prominent landmark in the limestone plains and thus has many traces of human occupation. The hills provide both shelter and a convenient look-out station. The most recent use at the time of the survey was by the Jordanian Army, who maintained a watch by a small garrison over the TAP Line track and routes southwards to the Saudi border. Several of the peaks have Safaitic inscriptions carved on the basalt boulders, as well as more modern Arabic graffiti. On the lower slopes are flint scatters and knapping floors. The earliest artefacts are Middle Palaeolithic. There is a large knapping floor on a bare slab of limestone where chalcedony was selected for the production of small flakes and irregular blade/bladelets. The date of this floor is uncertain. Chalcedony was used particularly in the Late Natufian and in the Late Neolithic and it is possible that the site dates from one of these two periods. A Late Neolithic date is perhaps more likely.

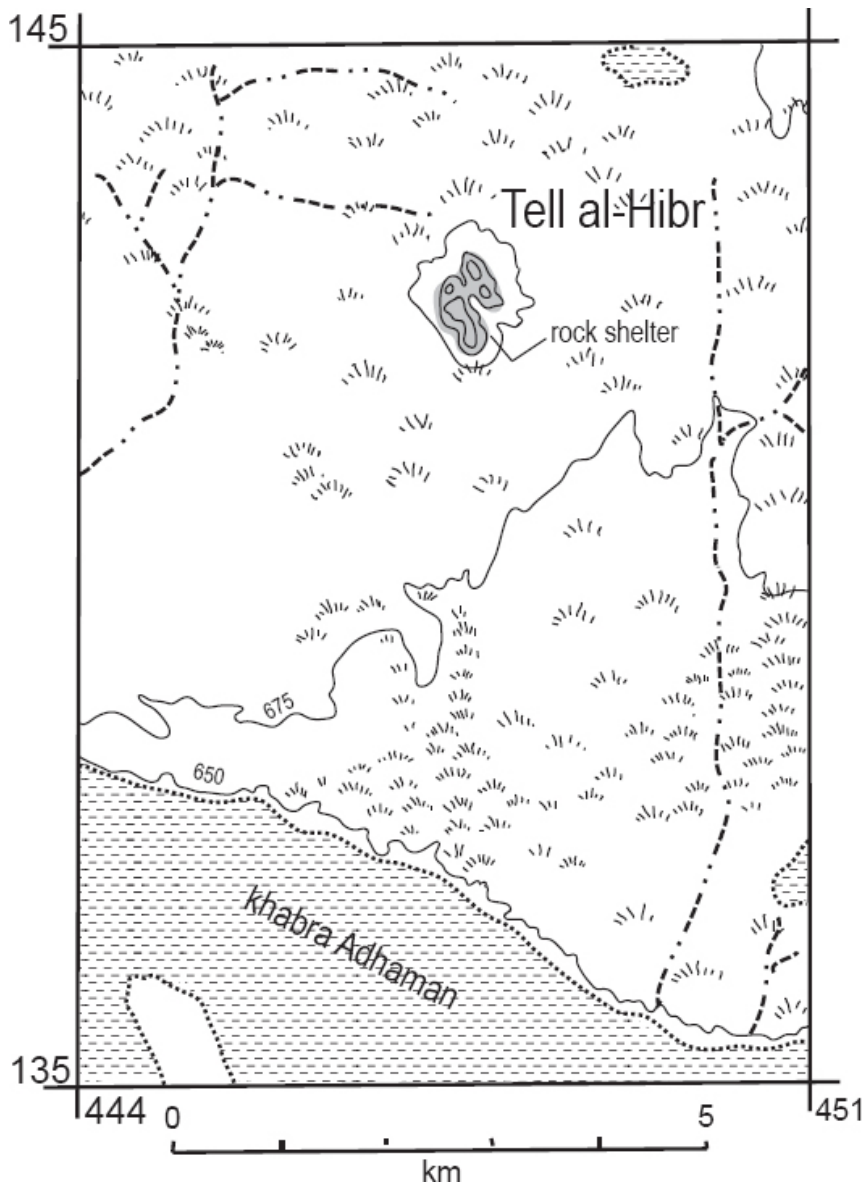


Figure 5.1 Tell al-Hibr: site location map

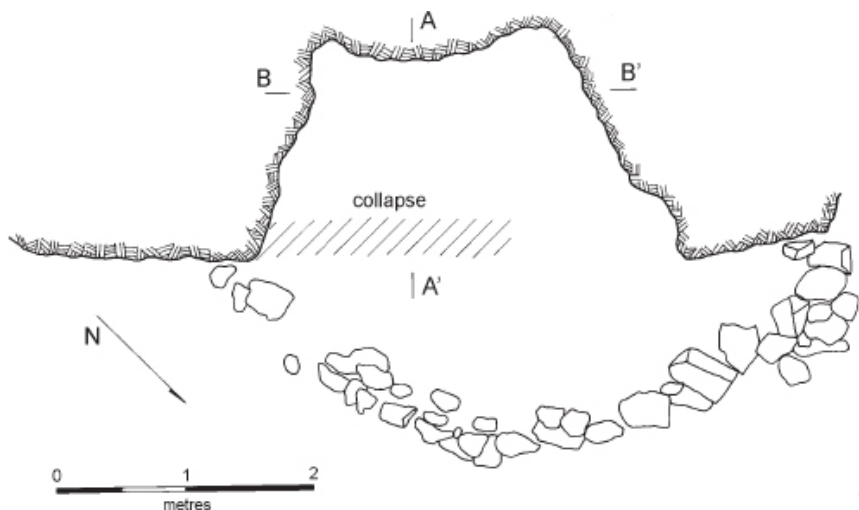


Figure 5.2 Tell al-Hibr: plan of rock shelter

The limestone beds vary in hardness, and differential weathering has created overhangs and small caves along the lower edge of a particularly resistant band of rock. Some of these hollows have been used as graves in various periods. A heavily eroded skull was found on the spoil from a robber pit on one part of the slope. Further to the south was a low rock shelter (Figs 5.2–5.3) partly walled in at the front and containing several skeletons partially embedded in a coarse soil and gravel fill. Outside the rock shelter was a low wall of basalt boulders and on the slope below was a small scatter of sherds and flint which appeared to be of Chalcolithic date. The original assumption was that the rock shelter had been used as a burial cave in the Chalcolithic, the bodies being placed in the cave and the entrance walled up; subsequent disturbance then created an opening and distributed artefacts associated with the burials down the hillslope. The cave contained a considerable depth of deposit and it was decided to excavate in case any of the burials remained relatively undisturbed.

Excavation showed that the original assumption was only partly correct. The burials, of two or more individuals, were relatively recent. Scraps of fabric, ostrich plumes, gazelle horns and an iron spear head were found together with the skeletons. The burials had been much disturbed, probably by wild animals. The lower levels below the burials contained a considerable depth of occupation deposit containing artefacts which showed that the cave had been inhabited in the later prehistoric period; typological parallels for the artefacts suggest the Chalcolithic as the period of occupation. The fill of the cave was punctuated by a series of deliberately laid stone pavements (P1–P4) (Figs 5.4–5.5). The sherds of a nearly complete crushed vessel were found on and among the slabs of one of the pavements (P2).

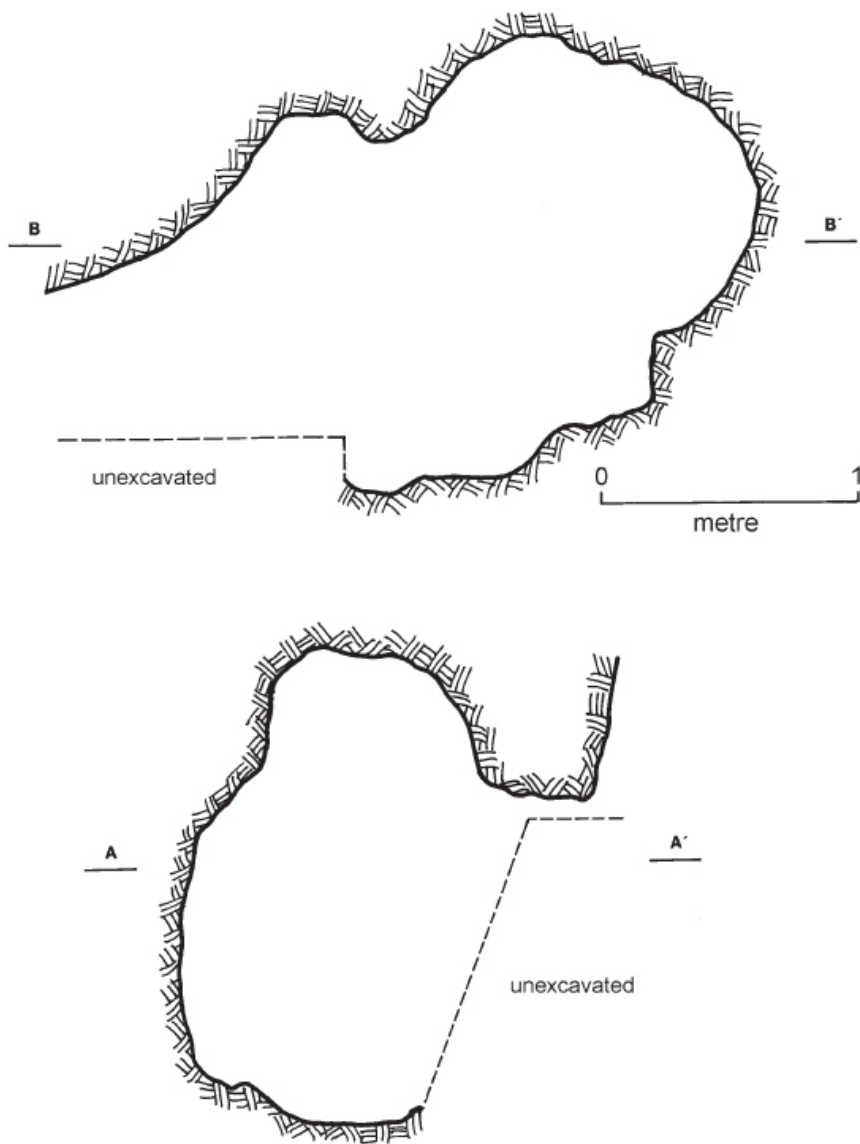


Figure 5.3 Tell al-Hibr: profiles of rock shelter

The cave consisted of a small chamber with access at the southern end to a low tunnel going back into the cliff. The front of the cave was blocked by fallen limestone slabs reinforced by rough stone walling. A small entrance was left open at one end. Outside the entrance was a rubble terrace. The main chamber of the cave was excavated to bedrock, the fill of the tunnel being left intact because of the practical difficulties of excavating it. Surface rubble and soil was cleared from

the terrace. A slit trench was laid out across the terrace but soundings here were abandoned after 0.3 m: a wider trench was needed to clear the rubble fill properly and this was not logistically possible. All earth from the excavations was sieved through 5-mm mesh and samples were obtained for radiocarbon analysis.

Dating

A single radiocarbon date was obtained for Tell al-Hibr (OxA-2767 3950 ± 80 BP (cal. BC 2674–2200)), but the results are problematic. Despite the fact that the sample was taken from a well-stratified context (108/Level 2) sealed below P3 in the fill from the removal of P2 and the underlying layers down to P1, it appears to be later than the associated ceramics (see Fig. 5.12) suggest. There is only a small sample of chipped stone from this level, which is not sufficiently diagnostic to assist in interpretation.

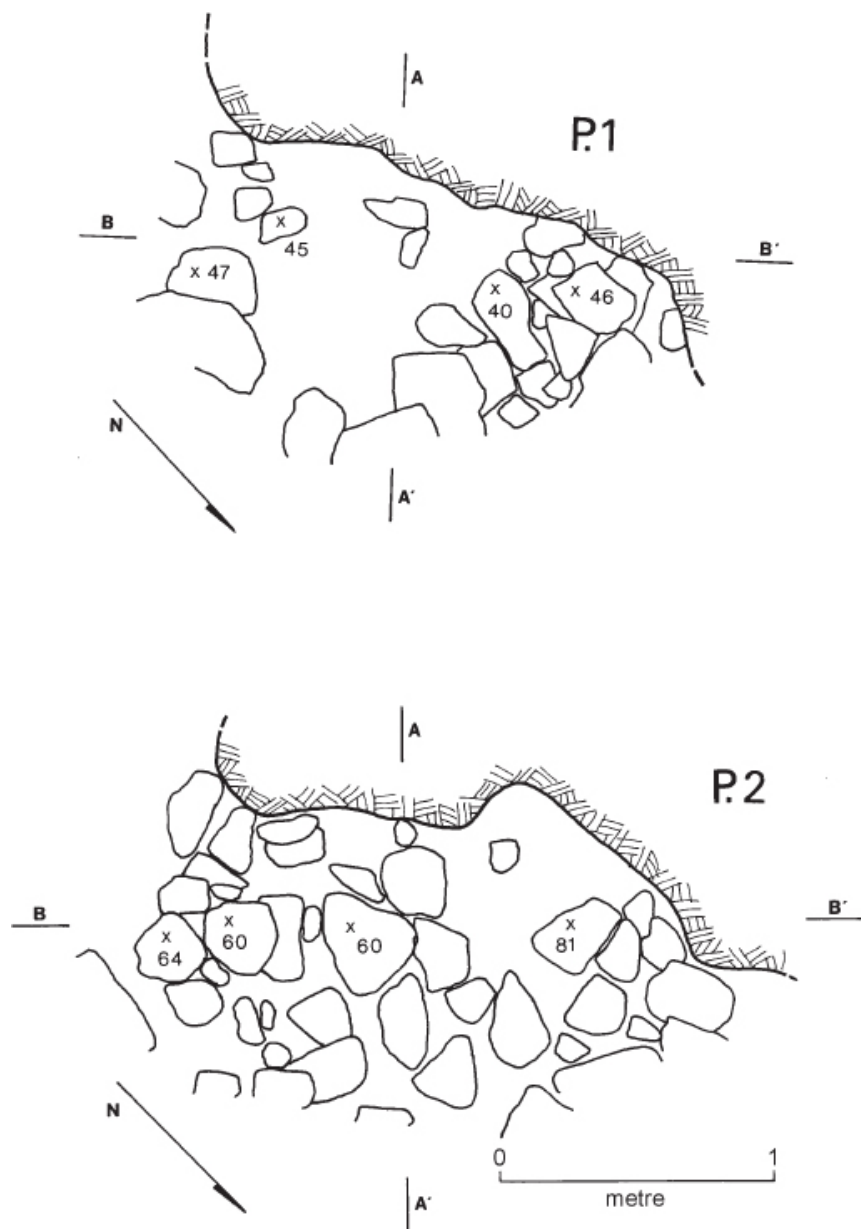


Figure 5.4 Tell al-Hibr: plans P1, P2

Stratigraphy

The site has two stages of use. The lowest stage, Stage 1, is the Late Chalcolithic occupation of the cave. Stage 2 includes the late burials. Levels classed as Stage 2

are all disturbed and close to the surface. They contain a mixture of artefacts, including sherds and chipped stone which should be more properly associated with Stage 1.

Stage 2

Level 5 was the topmost level. Included in it was the soil from surface clearance of the terrace and the disturbed upper layers of the cave fill. The recent burials were included in this level. These had been heavily disturbed by foxes and flooding. Within the cave, Level 5 included all the soil down to the surface of the upper pavement (P4). The fill was loose, mixed and contained a high proportion of animal droppings. Material cleared from the terrace consisted of loose sandy gravel and stones.

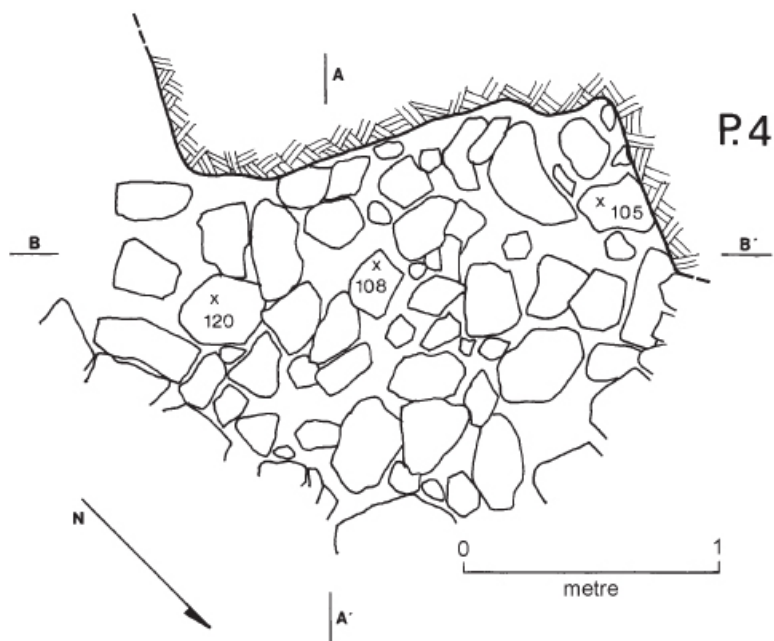
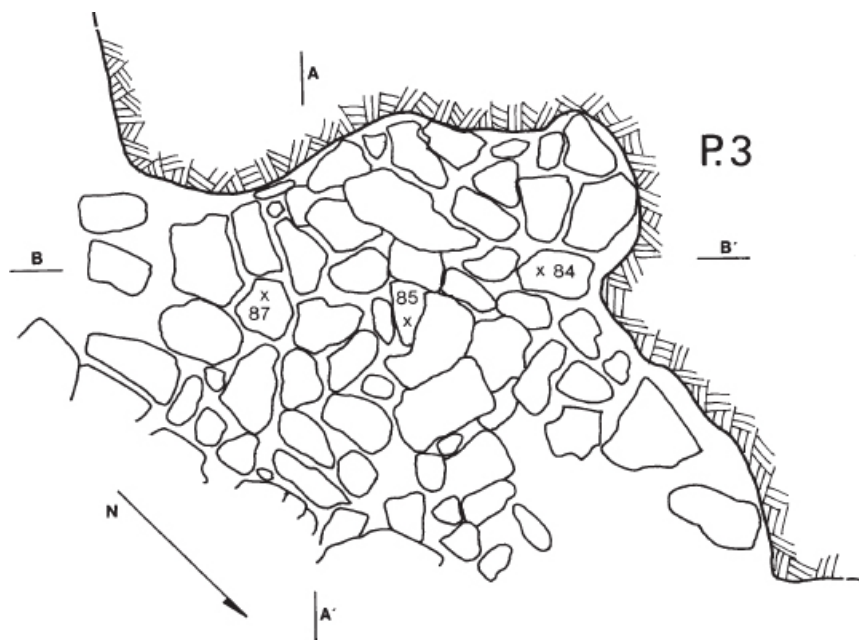


Figure 5.5 Tell al-Hibr: plans P3, P4

Stage 1

Level 4 comprised the undisturbed occupation levels between P4 and P3, and soil recovered during clearance of the upper pavement. The upper fill consisted of loose brown sediment with much bone and a few pieces of chipped stone. The lower fill included an irregular layer of sterile pinkish silt which seemed to be laid on and around P3. Level 3 included the removal of P3 and the levels down to the next pavement, P2. The fill was mixed brown sediment with bone and some artefacts. Level 2 included the removal of P2 and the fill between P2 and P1. The soil was dark brown and compacted in places, and contained bone and some artefacts. Level 1 comprised the fill between P1 and bedrock.

Phasing

Table 5.1 gives the relationship between layers as excavated and the phasing of the excavations.

Special finds

The special finds fall into two distinct groups: those in Stage 1 are associated with the prehistoric occupation of the cave and those in Stage 2 with the burials (Table 5.2). The date of the burials is not certain, but the organic preservation of both soft tissue and biodegradable artefacts suggests that they may be relatively recent. The climate at the site is very dry, which would aid in preservation; thus ‘recent’ in this context might include up to the last century or more. The most diagnostic artefact is the spear or lance head (Fig. 5.6). Such weapons are not in use at the present day and probably went out of use around the early decades of the 20th century. They are recorded by travellers in Arabia in the 19th and early 20th centuries: both Musil and Burkhart describe weapons of a type similar to that found at al-Hibr. Musil (1928, 132) describes the spear as an ancient weapon still surviving, and carried mainly by the poorer beduin. The head consisted of an iron blade sharpened on both edges, while the shaft was made of wood or bamboo. Occasionally the spear was ornamented with ostrich feathers. Burckhardt (1831, I, 52–3) describes a similar weapon with an iron head, a wood or bamboo shaft and sometimes two large balls or tufts of ostrich feathers placed near the top. Along the shaft between the two tufts were twisted strips of red cloth. Musil tells us that the ostrich feathers signify bravery in battle (1928, 551–2), and they are still in symbolic use today; bundles of ostrich plumes are attached to the front of motor vehicles, reputedly as an aid to speed. It is possible that the surviving feathers, along with some of the fabric, may have been associated with the spear point. No trace of the shaft survived but this may have degraded more rapidly than the other objects.

Description
Stage 2 Level 5
Loose rocks and sandy topsoil outside cave and wash inside cave. Bone, flint and pottery above P4
Sandy earth and large stones outside cave
Sandy earth and gravel outside cave
Sandy topsoil and rubble scree down exterior slope

007	dy topsoil and gravel in trench across exterior terrace
007	Stage 1 Level 4
004	upation deposit below P4. Loose brown earth, bone and chipped stone
004	Stage 1 Level 3
005	upation deposit below P3. Mixed brown earth with bone and some artefacts
006	aning surface of P3
006	Stage 1 Level 2
008	upation deposit below P2. Gravel and soft darkish silt
008	Stage 1 Level 1
009	upation deposit below P1 and above bedrock

Table 5.1 Tell al-Hibr: contexts by level

	No.	Description	Context
Stage 1	1	Ostrich shell, fragments	104
	2	Stone ring, fragment	108
Stage 2	3	Ostrich shell, fragments	100
	4	Ostrich feather, scraps	100
	5	Woven fabric, scraps	100
	6	Date stone	100
	7	Iron spear head	100
	8	Stone ring, fragment	100
	9	Ostrich shell, fragments	101
	10	Sandstone ring, broken	101
	11	Glass bead	103

Table 5.2 Tell al-Hibr: special finds

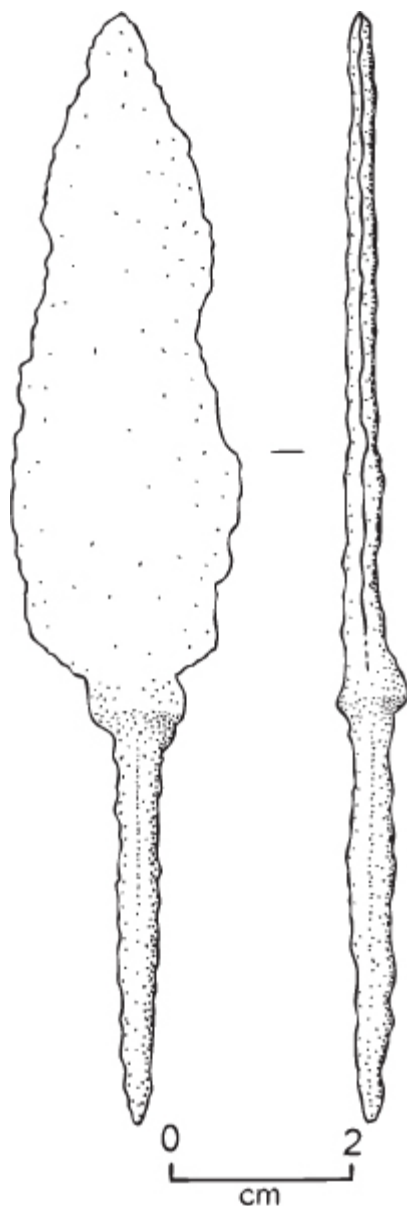


Figure 5.6 Tell al-Hibr: spear head 100/2

The ostrich eggshell occurs mainly in levels of Stage 2 (Table 5.3) and is probably primarily associated with the burial. Ostrich eggs were eaten by the desert hunter-foragers the Solubba (Betts 1989b, 63), and may well also have been used as water containers. Two broken stone rings were also found in Stage 2. One

was a large sandstone piece (Fig. 5.7, 1) and the other a smaller, roughly worked limestone example (Fig. 5.7, 2).

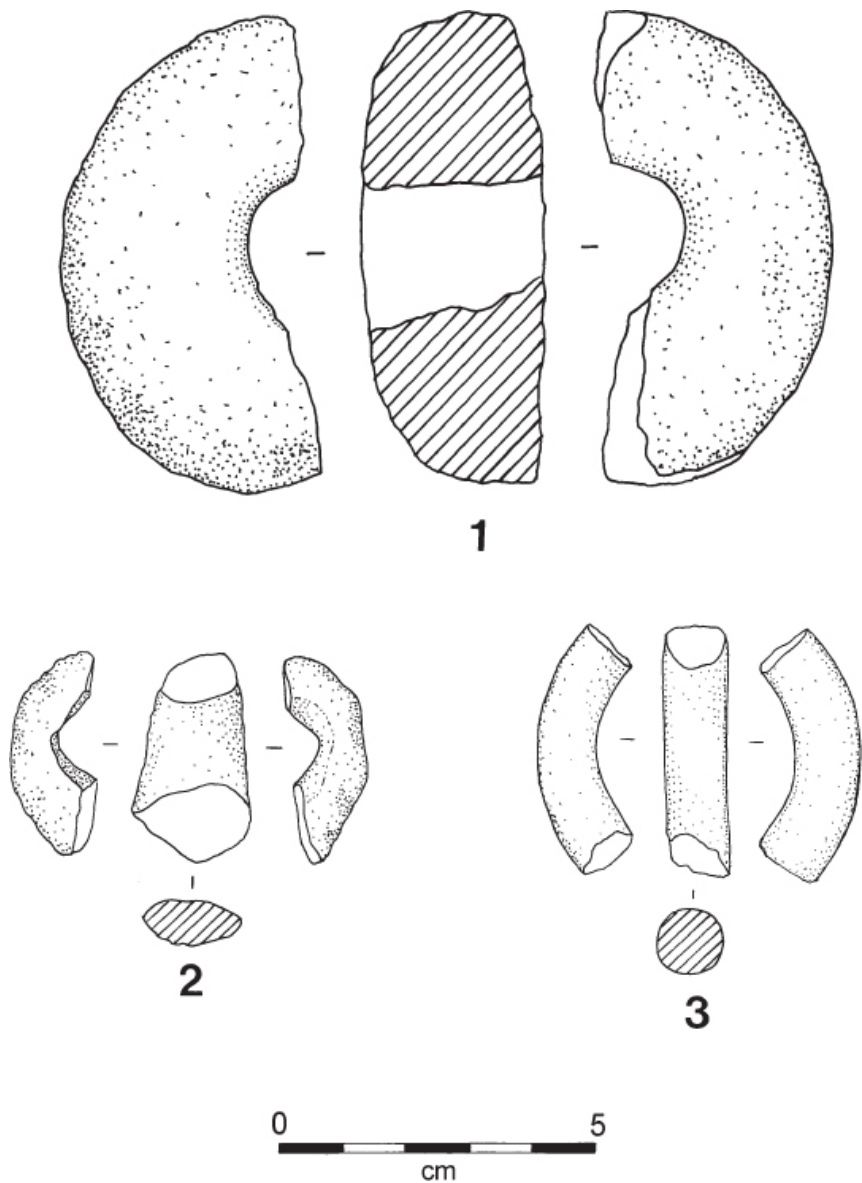


Figure 5.7 Tell al-Hibr: special finds. 1. Broken sandstone ring 101/2; 2. Broken limestone ring 100/2; 3. Stone ring fragment 108/1

The only finds from Stage 1 were some fragments of ostrich eggshell in the

upper levels, which may have filtered down from Stage 2, and a fragment of a finely worked stone ring (Fig. 5.7, 3) reminiscent of examples from the Late Neolithic levels on the Burqu' sites, such as the intact piece from 03000 (see Fig. 3.5, 2).

Chipped stone

Analysis of the chipped stone from the Tell al-Hibr rock shelter suggests a degree of uniformity consistent with a single-period occupation, or successive reoccupations over a relatively short interval of time. A significant proportion of the chipped stone was recovered from Level 5 (Table 5.4). Since these pieces derive from deflated and disturbed contexts and there is no evidence of later proto-historic occupation they have been included in the general analysis.

Raw material

Raw material used at the site was obtained from adjacent hillslopes. Medium-grain banded chert and fine smooth tan flint are the most commonly used materials. Some pieces are made on reworked Middle Palaeolithic debitage which probably came from a scatter on the hillslope opposite the cave.

<i>Level</i>
5
4
3
2
1

Table 5.3 Tell al-Hibr: distribution of ostrich eggshell by level

<i>Level</i>	<i>5</i>	<i>4</i>	<i>3</i>	<i>2</i>	<i>1</i>	<i>T.</i>
Core	20	0	10	8	0	38
Primary element	9	0	0	3	1	13
Core trimming element	2	0	0	4	0	6
Core rejuvenation flake	2	0	0	0	0	2
Blade	11	0	0	4	1	16
Flake	102	7	15	7	5	136
Burin spall	5	0	1	0	1	7
Splintered piece	0	2	0	0	0	2
Chip	65	7	1	24	7	104
Chunk	86	20	56	46	4	212
Retouched piece	89	12	42	33	5	181
Total	391	48	125	129	24	717

Table 5.4 Tell al-Hibr: chipped stone. Total assemblage count

<i>Tool type</i>	<i>Level</i>					
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>+</i>
<i>Arrowhead</i>						
Transverse	3	1	1	0	0	1
<i>Burin</i>						
On break	3	0	0	0	1	2
On truncation	1	0	0	0	0	1
Mixed	1	0	0	0	0	1
Broken	1	0	1	0	0	0
<i>Truncation</i>						
Blade	5	0	0	0	1	4
<i>Scraper</i>						
Flake, misc.	9	1	1	1	1	5
<i>Biface</i>						
Chopper	2	0	0	0	0	2
Misc.	1	0	1	0	0	0
<i>Tile knife</i>						
Knife	1	0	0	0	0	1
<i>Borer</i>						
On flake	6	0	1	1	1	3
<i>Notch/denticulate</i>						
Denticulated piece	1	0	0	0	0	1
Notched piece	3	0	0	0	0	3
<i>Misc. retouch</i>						
Blade	17	0	2	5	2	8
Flake	70	2	18	18	4	28
Chip	21	0	2	5	1	13
Chunk	34	1	5	12	1	15
Total	179	5	32	42	12	88

Table 5.5 Tell al-Hibr: chipped stone. Retouched pieces

Technology

Knapping techniques are crude and basic. Most cores are rough chunks with one or two flake removals. Some are more intensively worked, and a few trimming and rejuvenation flakes were found. There are some blades, mostly irregular in shape.

Both flakes and blades have broad plain striking platforms. Cortical platforms are quite common. A small number of flakes have wide faceted platforms, a technique which can be paralleled in Late Chalcolithic and Early Bronze Age industries in Syria/Palestine (Rosen 1997, 71; Betts 1991b, 140 ff., figs 174–7).

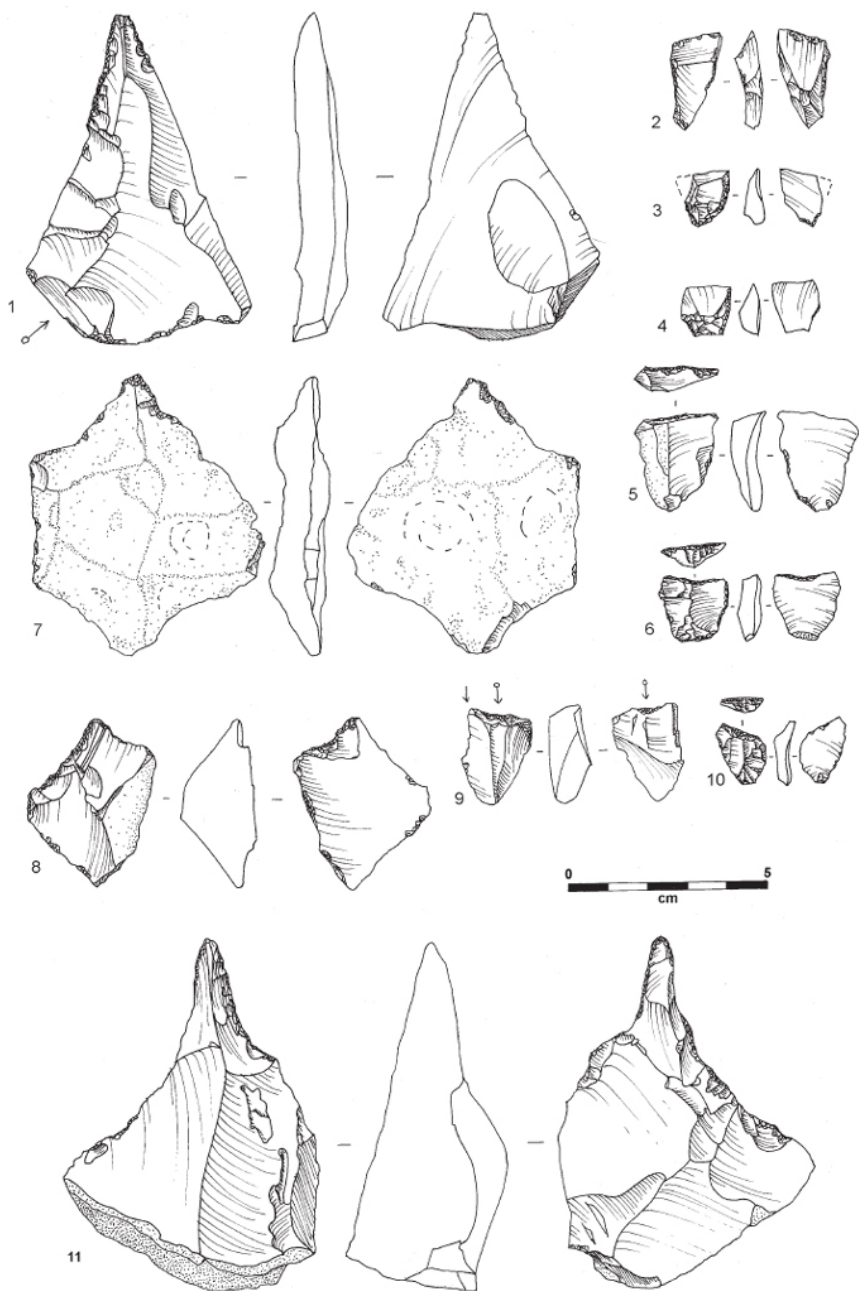


Figure 5.8 Tell al-Hibr: chipped stone. 1, 7, 8, 11. Borers; 2. Arrowhead on chip; 3, 4. Transverse arrowheads; 5, 6, 9, 10. Truncated blade segments

Tool typology

The range of tools is limited (Table 5.5; Figs 5.8–5.11). Many appear to represent *ad hoc* use of the chunks of chert which litter the hillside by the cave. However, the assemblage includes some tool forms which can be used as general indicators of the likely date range within which occupation of the site may fall. The retouched pieces are unsophisticated, with the transverse arrowheads most finely worked. In general, recognizable tool forms are uncommon, the bulk of the toolkit being made up of irregularly retouched blades, flakes and miscellaneous debitage apparently used at random and then discarded. In several cases retouch may be the result of use rather than the deliberate shaping of the piece.

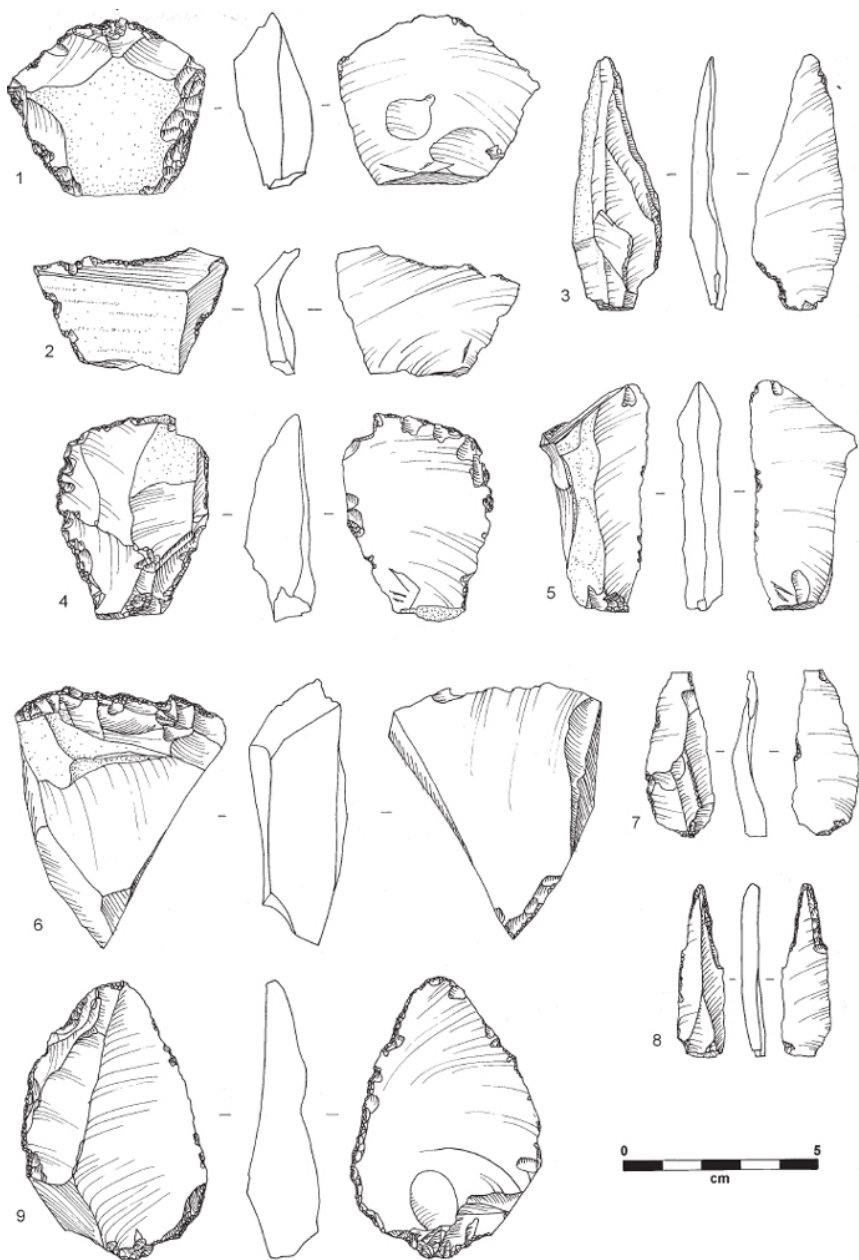


Figure 5.9 Tell al-Hibr: chipped stone. 1, 9. Flake scrapers; 2. Retouched flake; 3, 5, 7. Retouched blades; 4, 6. Denticulates; 8. Borer on blade

Three arrowheads were recovered from excavated contexts. All three are trapezoidal in plan. Two are true transverse arrowheads on blade segments; one is a piece worked in imitation of the same form, but on an irregular chip.

BURINS

Burins were not a significant component of the assemblage. Only six were found, all rather irregular or atypical. Three were burins on a break, one was a truncation burin, one a mixed piece and one a broken burin.

TRUNCATIONS

There were five truncated blade segments. All are similar, with an oblique or transverse truncation between 10 mm and 20 mm from the bulbar end of the blade. They are typologically related to truncated pieces from Late Neolithic/Chalcolithic sites around the lake at Burqu'.

SCRAPERS

The scrapers were made apparently haphazardly on convenient flakes. All fall into the general flake scraper category. They form the most numerous category in the assemblage.

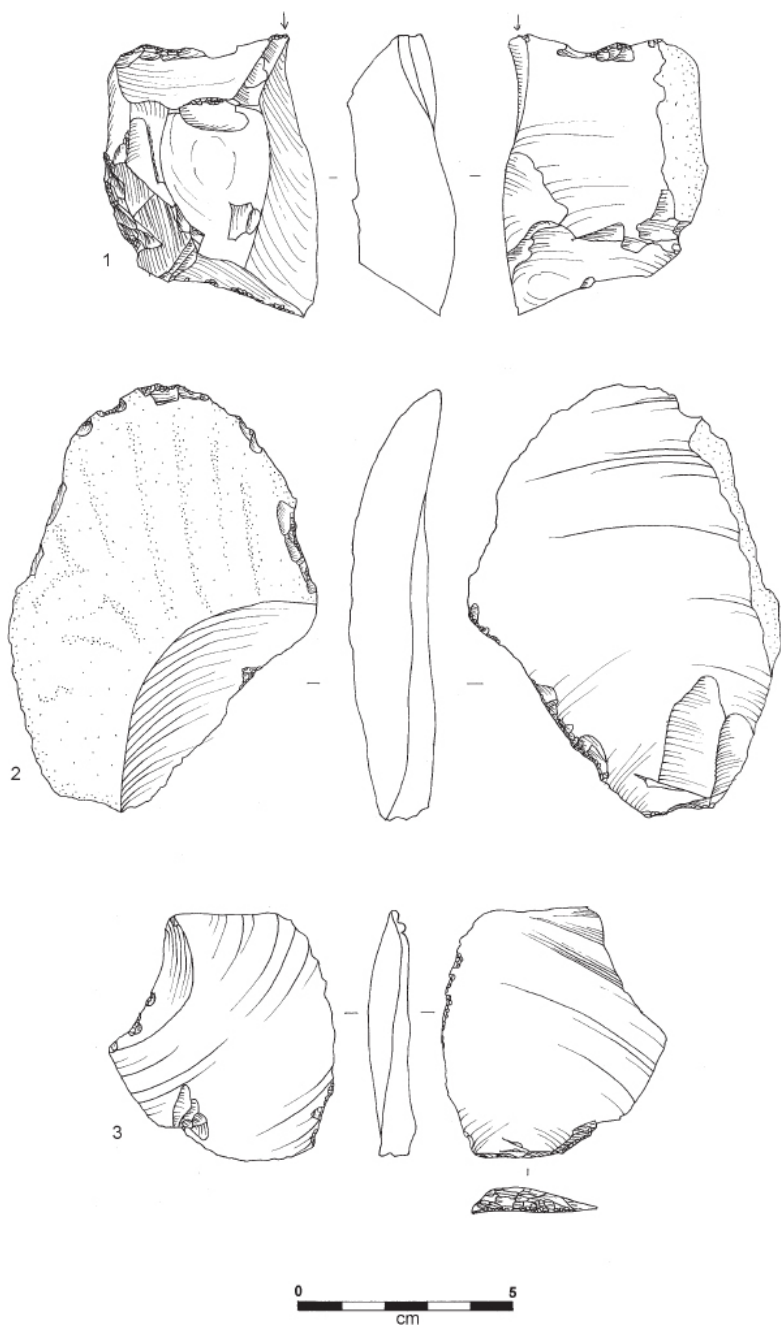


Figure 5.10 Tell al-Hibr: chipped stone. 1. Burin on break; 2. Flake scraper; 3. Retouched flake with faceted platform

BIFACES

The three bifaces are crude bifacially worked chopping tools.

TILE KNIVES

The single tile knife is also atypical, resembling classic tile knives only in that it consists of a retouched thin plaque of tabular flint.

BORERS

The borers, which are large and heavy, were roughly shaped on irregular flakes.

NOTCH/DENTICULATE

There are three notched pieces and one denticulate; again, these are rough irregular pieces representing almost *ad hoc* use of raw material.

RETOUCHED PIECES

The most common category in the assemblage is the miscellaneous retouched class. Retouched flakes and chunks occur in the greatest numbers, with only a limited proportion of blades.

Discussion

A detailed analysis of the chipped stone has been published elsewhere (Betts 1992, 12 ff.), so only a summary of the key features is presented here. The *ad hoc* nature of the assemblage suggests that it represents a local desert industry, but it has some features which can be related to other contemporary industries. The most obvious are the transverse arrowheads and the flakes with faceted platforms. Although the assemblage lacks other diagnostic artefacts, the range of tools is generally typical of industries of this period in Syria/Palestine. The abundance of good-quality chert immediately adjacent to the site has given the industry an individuality which, perhaps, makes it harder to link to assemblages from sites elsewhere. Tools are made on large chunky blanks, often with minimal retouch. Interestingly, almost all the tools and blanks seem to be of local cherts; there is little indication of the importing of tools or blanks from elsewhere.

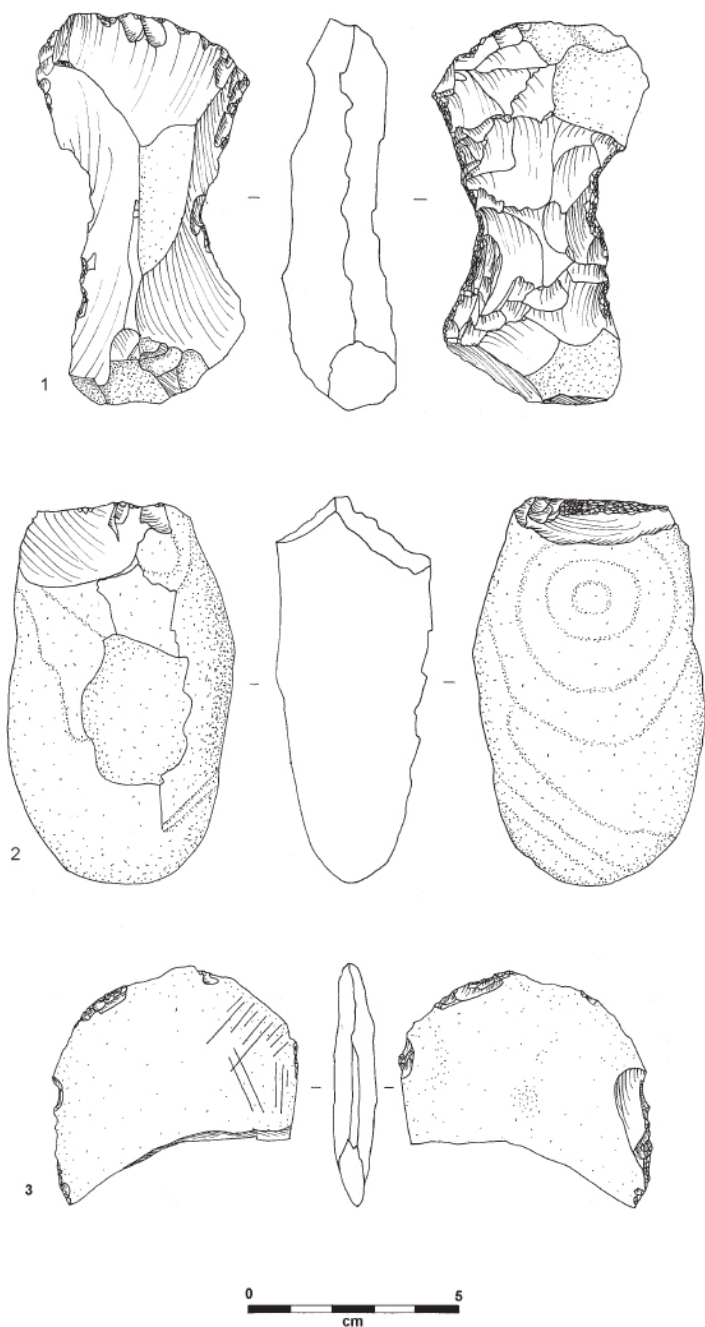


Figure 5.11 Tell al-Hibr: chipped stone. 1, 2. Bifacial tools; 3. Tile knife

Typological parallels are problematic, particularly with regard to dating. Transverse arrowheads first appear by the PPNC/ELN in the southern Levant and continue into the Chalcolithic (Baird 1993, 77–8; Rosen 1997, 39 ff.). They continue sporadically as microlithic lunates into the Early Bronze Age on sites in Sinai/Negev (Rosen 1997, 44) but do not occur in the EBA Canaanite industry of the Mediterranean climatic regions of the Levant. The flint assemblage from Early Bronze Age Jawa (Betts 1991b, 140 ff.) has close affinities with the Canaanite industry and has no recognizable chipped stone arrowhead forms, transverse or otherwise. The transverse pieces link the Hibr assemblage to the Burqu' sequence, as do the truncated blades, which are a distinctive feature of the later Burqu' assemblages. The Hibr assemblage corresponds most closely to that of Burqu' 02000, where the points group is dominated by transverse forms in the later levels and transverse truncations occur in significant numbers throughout. It is likely that the Hibr assemblage is slightly later, however, as flakes with a carefully prepared faceted platform suggest links with the technology of Chalcolithic, and more particularly Early Bronze Age, industries in the Mediterranean region. Overall, however, the distinctive nature of the assemblage, which finds its strongest links in the Burqu' traditions, suggests that the people using the rock shelter at al-Hibr were an indigenous North Arabian group with only distant connections to the southern Levant.

Pottery

The pottery from Tell al-Hibr consists of 131 sherds representing at least seven fabrics, of which three are preserved as recognizable forms (Tables 5.6–5.7, Fig. 5.12, 1–3). One base was found (Fig. 5.12, 4). The two jar shapes are securely stratified and the ledge handle (Fig. 5.12, 3) comes from the surface depositions. A detailed analysis of the ceramics has been published elsewhere (Betts 1992, 8 ff.), so only a short summary of the main conclusions is presented here. The best typological parallels for the Hibr jars occur in Chalcolithic assemblages of southern Palestine (*i.e.* the Beersheba area: *cf.* Gilead 1990, table 1: later Chalcolithic, 'Ghassul-Beersheba'). The basic vessel forms continue on into use in EBA assemblages, but as a minor part of more heterogeneous assemblages. The ledge handle is a form typical of southern Levantine assemblages whose origins lie in the Chalcolithic and even the late Neolithic periods. However, their application to jars, particularly large storage vessels, is a later practice which comes into use in EBIA (Helms 1992, 364, fig. 239, G69 2–4). Given the limited ceramic assemblage for al-Hibr, only a broad date within the late Chalcolithic into the EBI can be suggested. Parallels with the southern Levantine Chalcolithic equate well with the spread of sites into the southern steppe in the Chalcolithic (Henry 1982; Tarawneh 2007), although there is only very sparse data on ceramics from these sites (*e.g.* Henry 1982, 25).

<i>Level</i>	<i>Vessel</i>							
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>X</i>
5	2	2		3			4	12
4								
3	97	1	1					
2	3	1			4	1		
1								
Total	102	4	1	3	4	1	4	12

Table 5.6 Tell al-Hibr: sherd frequency matrix

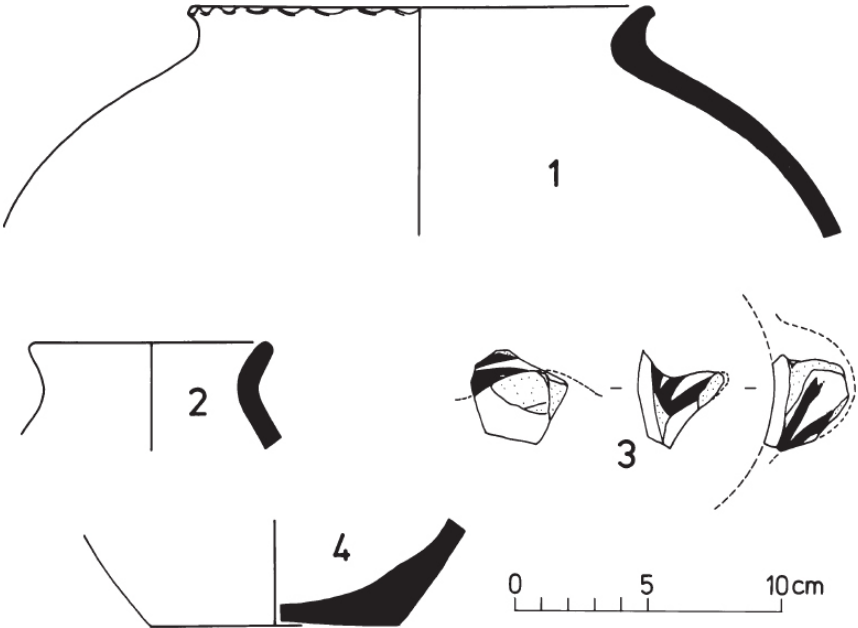


Figure 5.12 Tell al-Hibr: ceramics

- Fig. 5.12.1** rounded everted rim on bulbous neck, exterior lip formed into wavy pattern, high shoulder
- Fig. 5.12.2** rounded rim, S- or bag-shaped body
- Fig. 5.12.3** handle, rounded and upturned, stripes of red paint, handles (a pair) probably attached at waist of vessel
- Fig. 5.12.4** slightly concave

Table 5.7 Tell al-Hibr: diagnostic ceramics

	Stage 1 Contexts					Total
	104	105	106	108	109	
Cattle/equid/camel sized	50	24	14	11	0	99
Equid	3	0	0	0	0	3
Sheep/Goat/Gazelle sized	290	54	17	11	5	377
Gazelle	17	6	0	0	0	23
Sheep/goat	3	0	0	0	0	3
Large Carnivore sized	1	0	0	0	0	1
Dog/Wolf	4	0	0	0	0	4
Fox/hare sized	0	0	0	1	1	2
Fox	2	0	0	0	0	2
Hare	11	14	1	1	0	27
Hare sized	0	20	0	0	0	20
Cat – lynx sized	0	1	0	0	0	1
Porcupine	0	1	0	0	0	1
Small mammal sized	20	39	0	14	0	73
Hedgehog	0	1	1	1	0	3
Medium bird	0	1	0	2	0	3
Small bird	2	0	1	0	0	3
Non-ID	156	30	0	50	0	236
Total	559	191	34	91	6	881

Table 5.8 Tell al-Hibr: absolute numbers of all taxa (Stage 1)

Faunal remains

Stage 2

All the deposits from Stage 2 are potentially mixed. The proportion of identified specimens of the total is very low. Apart from one bird bone, everything else from Stage 2 is from inside the cave, from Context 100.

CONTEXT 100

Two camel bones were recovered: a distal tibia fragment 0.35 m long, and a proximal metapodial fragment with shaft, which was 0.25 m long. There was evidence for a small equid, with a tooth and third phalanx identified. Gazelle was more strongly represented, by five horncore fragments, five maxilla pieces with teeth, two loose maxillary teeth, three mandible fragments with teeth and one distal metapodial fragment. Two fragments of oryx horn cores and one piece of actual horn were all burnt, as was a single fragment of goat horncore. Smaller mammals are represented by a canid tibia and a mandible with teeth, and fairly numerous fragments of hare bones (*Lepus*), including approximately ten each of mandible and maxilla fragments, some ten vertebral fragments, fragments of a scapula and a pelvis, a humerus, three femurs and a tibia. Two porcupine quills were also found.

CONTEXT 102

The only identifiable bone recovered from outside the rock shelter was a medium-sized bird femur from Context 102.

DISCUSSION

The survival of the oryx horn fragment, porcupine quills and a piece of hoof sheath suggests that a proportion of the faunal remains is fairly recent. It is likely that the

deposit is mixed, with mainly old material and some more recent. A number of the pieces are charred, including the camel bones as well as the oryx and goat horn cores. The material shows no signs of gnawing, so that despite the recovery of the finds from a small cave suitable for use as an animal den, the bones do not seem to have been deposited by carnivores. This suggests that the cave was used for shelter in Stage 2 before its final function as a burial chamber; given its small size, it is most likely that it was occupied in the winter months, when protection was needed against the cold. Unless the occupants wished to conceal their fire from sight, it would have been much more comfortable to cook on the external terrace in the warmer seasons of the year.

Stage 1

A total of 881 bone fragments was recovered from Stage 1 contexts, of which only 67 (8%) are identified to taxon rather than animal size category (Table 5.8). The deposits from Stage 1 are well stratified and sealed under a series of stone pavements, and the bones and bone fragments are fairly well preserved; only one instance of burning was noted (Table 5.9).

CONTEXT 104

High fragmentation led to much of the bone material being identified only to size category. This included 50 pieces of cattle/equid/camel size, consisting of 35 longbone fragments, 5 skull fragments, 6 mandible fragments and 4 tooth fragments. One mandible fragment of a large carnivore size was recovered but it could not be more precisely identified.

Level	Context	Modal frag. size	Frag. size range	Subjective preservation	Angularity	Colour						
						White	Fawn	Ginger	Mid-brown	Dark brown	Grey	Black
4	104	30-50, 50-100	10-120	Fair/good	Sharp/spikey		x					
3	106	30-50, 50-100	10-120	Fair/good	Sharp/spikey		x					
3	105	10-30, 30-50, 50-100	10-150	Good	Sharp/spikey				xxx			x (1)
2	108	10-30, 30-50, 50-100	10-100	Fair/good	Sharp/spikey		x			x		
1	109	10-30 but many mod breaks		Fair	Sharp/spikey battered		x					

Table 5.9 Tell al-Hibr: preservation condition of animal remains (Stage 1)

A further 290 fragments were of sheep/goat/gazelle size, including 18 skull pieces, over 100 tooth fragments, 9 rib fragments, 4 vertebral fragments and 157 longbone fragments. Unidentified small mammals consisted of a maxilla fragment and 19 longbone fragments. There were also 2 small bird bones, and 156 fragments that could not be identified even to size class.

Of the identified fraction, 3 pieces were equid: a mandibular M3, a tooth fragment and an occipital condyle. A total of 17 fragments were identified to gazelle: 2 horncore fragments (1 male, 1 female), 1 maxilla with teeth, 3 maxillary teeth, 1 mandible fragment with teeth, 1 mandibular condyle and 9 mandibular teeth. Three fragments were identified to sheep/goat but could not be further separated: 1 maxilla tooth fragment and 2 mandibular teeth. Three deciduous tooth fragments could be identified to wolf; a mandible fragment was identified to dog; 2 fragments were from fox (a mandible and a humerus), and 11 fragments belong to hare, including 2 maxilla, 2 mandible fragments, 1 vertebra, 1 scapula, 3 humeri, 1 tibia and a calcaneum.

CONTEXT 105

Again, extensive fragmentation has resulted in a high proportion of size-class fragments. Of cattle/equid size there were a total of 24 fragments, including 20 longbones, 1 petrous temporal, 1 atlas fragment and 2 tooth fragments. The sheep/goat/gazelle size class consisted of 41 longbone fragments, 1 vertebra fragment, 3 ribs, 1 flat-bone piece and 8 tooth fragments. Of the 20 hare size fragments, 16 were longbone and 4 vertebral. Small mammal pieces included 26 longbones and 13 mandibles, totalling 39. A further 30 fragments were completely unidentifiable even to size class.

Of the identifiable fraction, there were 6 gazelle pieces, including a first phalanx, 2 second phalanges, a maxilla fragment and two mandible fragments showing very heavily worn teeth, seemingly from old adult animals. Hare bones totalled 14, including 7 maxilla fragments, 5 humeri, 1 tibia and 1 pelvis. There was a single hedgehog bone – a humerus; a distal humerus from a medium-sized cat cf. lynx; 1 piece of porcupine quill and a medium sized bird phalanx.

CONTEXT 106

In total, 14 longbone fragments of cattle/equid size were recovered from this context. Animals of sheep/goat/gazelle size were represented by 14 longbone fragments and 3 rib fragments. Small mammal remains included 1 hare maxilla fragment and 1 hedgehog mandible without teeth. There was also a carpometacarpus from a small bird.

CONTEXT 108

This context had a large number of fragmentary and unidentifiable bones. Of those that could be identified, 11 were longbones from cattle/equid and 11 were from sheep/goat/gazelle-sized mammals; these latter included 8 longbones, 1 tooth fragment and 2 vertebra fragments. Small mammal remains included a hare acetabulum, a hedgehog humerus fragment, one unidentifiable fragment from a fox/hare-sized animal, 14 bones from unidentified small mammals, a long bone and a third phalanx from a medium-sized bird and 50 fully unidentifiable pieces.

CONTEXT 109

This produced six unidentifiable fragments, five of them from sheep/goat/gazelle-sized animals and one from a fox/hare-sized animal.

DISCUSSION

The surface conditions of the faunal material show no carnivore gnawing marks, or breakages signifying carnivore activity, so it can be assumed that, with the exception of the small mammals, most material arrived on site as a result of human deposition. The recovery of a porcupine quill from 105 is a little unusual as it would not be expected to preserve well, but this context was very securely stratified and there is only a small chance that the quill was dragged down by rodent burrowing. Although they vary in numbers, the samples are fairly similar throughout all levels. Throughout the whole sequence, sheep/goat/gazelle sized material predominates, but very little is identified to actual taxa. Where it is, there are very few caprines, and more evidence for gazelle, suggesting a greater

emphasis on hunting than herding. All levels have some large mammals of cattle/equid size but it should perhaps be assumed that most was from equids, since no recognizable cattle bones were found in the whole corpus. While oryx would fall into the same size category, there is no definitive evidence for oryx bone in Stage 1. Because of the high fragmentation, it is impossible to say for certain if any of the animals were domesticated. Equid remains could have been from wild onager.

The date of the cave deposits is uncertain. The pottery suggests a Chalcolithic date while the C14 analysis gives a date in the Early Bronze Age. Donkeys are believed to have been domesticated in the southern Levant by the Chalcolithic (Vila *et al.* 2006), while at the Early Bronze Age site of Jawa on the south-western slopes of Jebel Druze in the western *harra* cattle were one of the most significant domesticated animals (Köhler 1981). This practice has been recorded for the later part of the Early Bronze Age further to the north in the Syrian Hauran (Vila 2004). The importance of cattle is underlined by the plethora of rock engravings around the waterfalls near Jawa (Helms 1991c). Significantly, cattle carvings of similar style can be found occasionally in isolated locations across the *harra* and are remarkably common in north-western Saudi Arabia (Betts 2001). Cattle are also reported from the Chalcolithic site of Jebel al-Jill in the Judayid basin of southern Jordan (Henry 1982). The *badia* is at present a very hostile environment for cattle which require substantial quantities of water and grazing daily. The evidence from the Syrian Hauran and Jawa concerns outlying settlements with substantial water harvesting systems but it is possible that in the wetter seasons during the Bronze Age, cattle were herded further out into the steppe. Whether they reached Tell al-Hibr is debatable.

Summary

Tell al-Hibr is unique in that no other rock-shelter site of this period has been identified in the eastern *badia*. This is likely to be due to a lack of research, however, rather than a sign that the Hibr shelter possesses any unusual attributes. All the indications are that it was used for domestic occupation sporadically over a protracted period of time. There are numerous caves throughout the *harra* and slightly fewer in the *hamad* and, although they present dangers, primarily the possibility of conflict with predators, most notably the hyena, they would certainly afford valuable places of shelter in wet, cold and windy weather. The dating is slightly problematic, in that the single absolute date appears to conflict with the relative dating based on material culture. Given the limited nature of the evidence overall, it may be suggested that the site represents casual occupation over a period around the late Chalcolithic and into the EBI. There is no evidence for ceramic traditions specific to the *badia* in this period and the ceramic parallels suggest cultural contact with the southern Levant. This is reflected to a lesser degree in the lithic assemblage, which shows general associations with the chipped stone traditions of the southern Levant, but most closely resembles the Burqu' assemblages, with elements unique to the eastern *badia*. The material culture of the southern Levantine Chalcolithic finds its closest parallels in the Sinai and Negev arid zone sites rather than in the villages of the Rift Valley (Henry 1982; Tarawneh 2007). The evidence suggests an expansion eastwards into the southern *badia* in the Chalcolithic. Whether this influence spread north through the steppe is as yet unclear. The faunal remains are most indicative of a hunter-herder

economy. The presence of large mammal bones may indicate the use of equids for transport or, less probably, reflect the expansion of cattle herding into the deep steppe.

6. Area Survey in the *Hamad*

A. Betts, D. Cropper and W. and F. Lancaster

The Badiyat al-Sham

The Badiyat al-Sham comprises the northern part of the Arabian steppe; it is bounded to north and east by the river Euphrates, to the west by the well-watered highlands of Syria and Palestine and to the south by the Nafudh desert. Most of the region consists of open steppe, and rainfall ranges from 250 mm per annum in the north to less than 50 mm in the south. Running across Jordan from Jebel Druze in southern Syria to Jauf in Saudi Arabia is the basalt *harra*. East of the *harra* a series of wadi systems, al-Wudiyān, drains down into the Euphrates, and to the south-west lies the Sirhan depression. Roughly in the centre of the Badiyat al-Sham, on the eastern edge of the *harra*, is ar-Ruweishdat, a series of wadis running north-west from Jebel Aneiza towards the Ruhbah depression and the north-eastern flanks of Jebel Druze. Qasr Burqu' stands on one of these wadis, beside a large seasonal rainpool or *ghadir*.

The *harra* is rough and difficult terrain covered by a layer of basalt cobbles and cut by wadis draining off the central highlands of Tulul al-Ashaqif. In some places the wadis open out and have silted up to form stretches of mudflat, while in others the wadi beds have eroded to form small depressions which hold rainwater into the dry season. The *hamad* consists mostly of low rolling limestone hills and flat open country. In the far south-east the land rises up to Jebel Aneiza and, from here, the wadis of the Ruweishid and Dumeitha systems drain off north-westwards. The Ruweishid wadis are broad and quite deep, with extensive flood plains and incised streambeds. Rainpools form in the wadi beds and the flood plains are relatively densely covered in perennial shrub growth. In a number of places, particularly in Wadi Hauran, wells tap into subsurface water sources. In September and early October heavy dew encourages the growth of fresh vegetation. By late October the rains begin, continuing until March. The rainfall pattern is often one of heavy localized storms with resultant dramatic runoff and flooding of the wadi beds. Annual growth of grass and flowers appears in spring on the flood plains and

on the hills, particularly in gullies and small hollows.

The *hamad* east and south-east of Qasr Burqu' was surveyed extensively. The area covered is large and consists of open rolling gravel plains broken by wadi systems. In the north these are relatively shallow, but to the south and east the wadis are deeply cut, with wide flood plains and relatively steep slopes. The wadi beds here are cut into the flood plain with *ghudrān* scattered at intervals along them. Survey was conducted by vehicle, with frequent stops to examine specific sites and areas. The area covered, the proximity to sensitive and ill-marked territorial borders and the extreme conditions occasionally encountered made intensive study unfeasible, but the sites recorded cover a fully representative sample of human use in the region. Local informants gave directions to the known standing remains such as the *mahāfir* and Islamic sites; other such sites were located by chance in the course of the survey. The objective of the survey was to cover most of the region by vehicle and to make more detailed studies of specific sample areas. Accordingly, the region was divided into a number of sectors (Fig. 6.1): 1) the H4/Ruweishid area, north of the Baghdad Highway up to the Syrian border in the north and the Iraqi border in the east; 2) the Ruweishdat wadi system south of the Baghdad Highway comprising the central *hamad* east to the Iraqi border and south almost to the Saudi border; 3) the Dumeithat wadi system and the edge of the basalt south of the Baghdad Highway; 4) the edge of the basalt north of the Baghdad Highway towards the Syrian border.

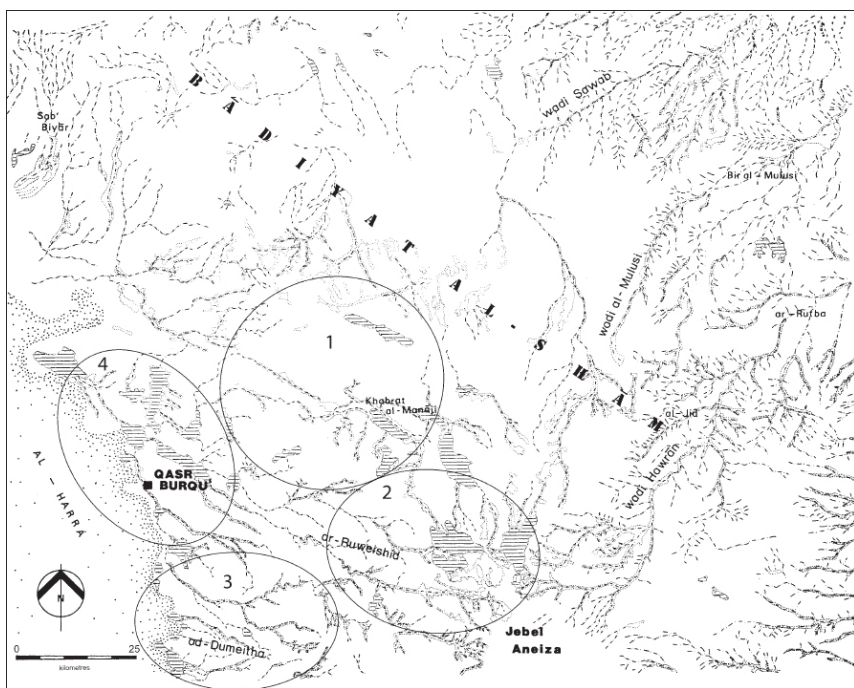


Figure 6.1 Eastern hamad: location of survey sectors

Site inventory

Sector 1

88/2001 This is a flint scatter from the open country east of Ar-Risha up to Tell Sidd Risha. It was a mixed collection including some Levallois flakes, some tabular flakes and some miscellaneous debitage.

88/2003 Tell Bustan al-Gharbi Horseshoe-shaped mounds for water storage were recorded at this site. Based on evidence from Ar-Rishat Anwar and Mahāfir ash-Shahami (see below), these are Early Islamic in date.

88/2004 This was a camel-herding camp with small clusters of stones, a fragment of a basalt mortar, two basalt grinding slabs and a Jafr core.

88/2005 This site, near Khabrat al-Manaji, is similar to 88/2004, with small clusters of stones and a basalt quern.

88/2006 This is a hilltop site with a recent beduin wedding camp as well as pre-modern graves and a desert mosque.

88/2007 This site is a cairn on a promontory overlooking a wadi south-east of Tell Sidd Risha. There are also pre-modern graves and a mosque.

88/2008 This site is a ruined corral with a small scatter of concave truncation burins on a wadi just south-east of 88/2007.

89/1 Jebel ar-Rishat This is a 'burin Neolithic' site on a low hilltop. The site is some 400 m long and thickly strewn with fragments of broken flint. There was a concentration of large tools and flakes, mostly burins, some tabular flint and some Middle Palaeolithic pieces. Surface collection resulted in an assemblage of 402 pieces, the raw material for which was a medium to dark brown fine-grained flint.

The collection is dominated by burins ($n=236$), which comprised 73% of the formal tools. As on most burin sites, truncation burins are most common ($n=208$) and most have multiple removals. While most of the truncation burins show no signs of use, 20 (roughly 10%) have used burin edges, and 14 show retouch along the lateral edge of the burin removal. Multiple mixed burins ($n=7$), a burin on a break, a transverse burin and broken burins ($n=19$) were also identified. The burins are fairly uniform in size and shape and most are made on blades.

Truncations ($n=27$) are the second most common tool type. Most are unipolar ($n=25$); otherwise, they are almost identical in form to the truncation burins and probably represent blanks for burin production. If so, it may suggest that spalls were removed from one platform at a time, a second truncation being created for use as a striking platform only when the first striking platform was exhausted. These pieces are quite different from the small truncations on cortical flakes from the later Burqu' assemblages.

Among the remaining tool types in the assemblage 20 notched pieces were identified. Most were produced on flakes ($n=17$) and often had a snapped end. The notches were mostly large and abruptly retouched. Denticulates comprised some 5% of the assemblage ($n=22$) and formed a varied group including examples made on both flakes ($n=16$) and blades ($n=6$). Eleven borers were found, ten on flakes and one on a blade. They ranged in size from less than 20 mm to over 110 mm. Sidescrapers ($n=4$) and endscrapers ($n=3$), most of which were made on flakes, were also recovered. There was a single tile knife, which was roughly made with a sinusoidal profile to both lateral edges. The retouch was long on one side and invasive on the other. Non-formal tools (NFT) accounted for 19% of the

assemblage (n=77) and included 21 retouched blades, 54 retouched flakes and 2 retouched pieces.

89/2 Khabrat Um Sahaliya This area of mudflats was probably used by camel herders who camped without tents. The site is in an area of good spring grazing. Surface finds included a flint scatter as well as small areas cleared of pebbles and containing small stone-ringed hearths. The flints comprised a small collection of relatively large nondescript flakes and blades.

89/3 Mahāfir ash-Shahami This local landmark comprised a series of large white horseshoe-shaped mounds created by the excavation of a number of pools for water run-off collection and storage. Two ruined Islamic structures were found to the east, while a number of camp sites on the slope above also had evidence of use in the early Islamic period. The site was fully surveyed and soundings made in the structures (Betts 1993b).

89/4 Wadi Salih This was a south-facing slope with a flint outcrop. A scatter of Jafr cores for the production of tabular flakes indicated that flint mining had taken place here, probably in the Chalcolithic to Early Bronze Age. Similar mines have been documented in the al-Jafr basin in the south of Jordan (Quintero *et al.* 2002).

89/5 southern Wadi Salih A limestone cairn with pre-Islamic inscriptions is located on a low hill overlooking a *ghadir*. More recently, it had been used as a grave of the type constructed by the Ahl al-Jebel to represent a tent. Associated with this usage were Arabic inscriptions dated 1985 and 1986. T-shaped pieces of flint were also found on the surface (*cf.* Betts in Helms 1990, 159 ff).

89/11 This is the area around Mahfour al-Ruweishid; a series of corrals was recorded along the edge of Wadi Ruweishid.

89/12 This site is situated at the confluence of Wadi Ruweishid and a tributary wadi from the west, and consists of a large number of stone corrals that appear to have been constructed over many periods, probably from prehistoric to recent. For the purpose of surface collection the whole area was divided up into units. One corral was also planned (Fig. 6.2), but surface collection in and around the structure failed to produce diagnostic artefacts.

Unit A: a nondescript collection, possibly some Neolithic.

Unit B: a mixed collection of all periods, Neolithic to modern.

Unit D: a mixed collection including undiagnostic coarse ware pottery and one concave truncation burin.

Unit E: a small miscellaneous nondescript collection including some modern items and some possibly Neolithic debitage.

General: a mixed collection, probably mostly Neolithic.

89/13 This site is a flint outcrop with Jafr cores and a pre-Islamic inscription on a limestone slab.

89/15 Tell Sidd Risha This hill is a local landmark in the flat lands of the eastern watershed. On it are the remains of a rectangular structure with limestone walls roughly 1 m thick. A desert mosque lay to the north. The mosque is about 100 m long with a curving *mihrab* measuring 5 m × 5 m. The flint outcrops on the sides of the hill had been used as knapping sites throughout most of prehistory from at least the Middle Palaeolithic onwards.

89/16 This site is a ridge of higher ground east of Burqu' with limestone outcrops and flint scatters, which mainly consist, as in the Burqu' assemblages, of small cortical flakes.

89/17 Finds from this site consist of a large collection of large, darkly patinated blades on the north bank of Wadi et-Taxi (a modern name given by the beduin to this small watercourse after a vehicle had an accident there during a flash flood). There were no obvious diagnostic pieces, but the technological attributes suggest a possible date in the Upper Palaeolithic.

Ar-Risha (1987) This is a Jafr core site in the wadi near the Sha'alan settlement. The collection consists of six flakes, five blades and one core fragment. All six flakes (four complete flakes, one distal fragment and one medial fragment) are cortical, and five have hinged terminations. Three of the butts are cortical and one is faceted. Among the flakes are one side scraper, a T-shaped piece and four retouched flakes. The T-shaped piece, made on a much older and highly patinated flake, is formed by three large dorsal retouched notches in which fine retouch is concentrated. One of the points of the T-shaped piece is missing. Unlike many other T-shaped pieces, one of the points of the 'T' is finely retouched. The five blades all have approximately 10% cortex. The intact butts include one faceted butt, two cortical butts and one flat butt. The blades are patinated and all but one demonstrate two stages of retouch. The blade tools include one notch, a truncation and three retouched blades. The core fragment was of an exhausted opposed platform mixed flake/blade fragment core which was reused and retouched.

Sector 2

88/1001 This site is a stone circle with interior divisions on a ridge above a wadi in the Ruweishid system near the Iraqi border. It is built of flint chunks and probably dates to the historical periods. It had been damaged at some time after its original use in order to build a grave.

88/1002 This site consists of a stone circle site with several enclosures, some with sub-rectangular sections. The corrals are approximately 10 m in diameter. They are sited on the crest of the ridge, near to available sources of building stone.

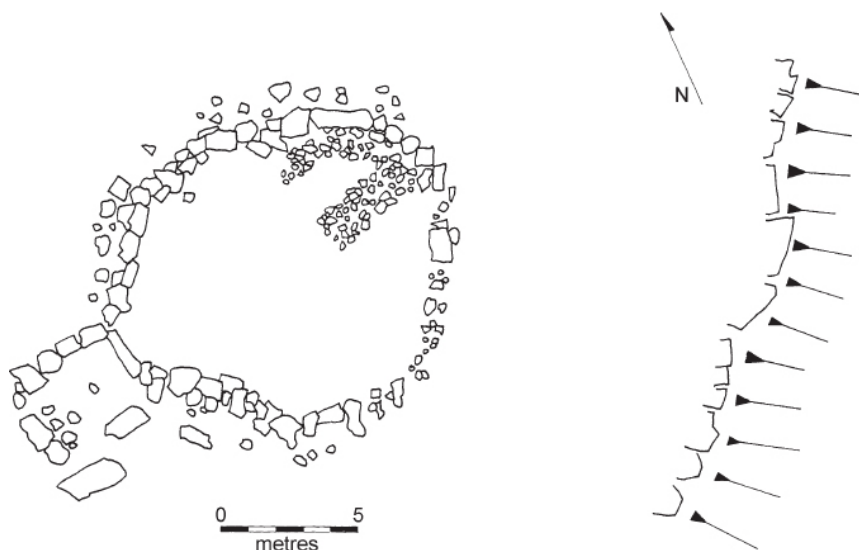


Figure 6.2 89/12 stone corral

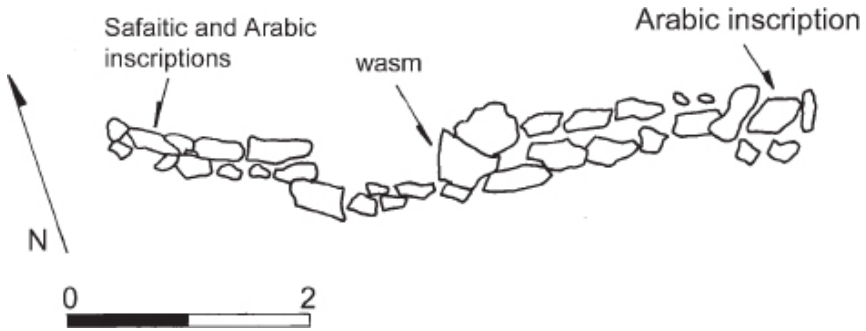


Figure 6.3 88/1016 desert mosque

88/1003 This site is a desert mosque built of a single line of chert chunks and sited on a low ridge south of Wadi al-Atheyna.

88/1004 This site is a stone corral that is situated on the slope above a wadi and close to a chert outcrop. Surface finds included one concave truncation burin. The corrals had recently been reused.

88/1005 This site is 200 m north of Site 88/1004 in a sheltered location with a view of three wadis. The site consists of a scatter of concave truncations burins and debitage, with traces of indeterminate structures.

88/1006 This site is a complex of walls with the faint remains of small stone circles some 3–5 m across, together with a later grave and a long wall. A scatter of concave truncation burins and debitage was found around the stone circles.

88/1007 This site is a series of structures including an Ahl al-Jebel grave, pre-Islamic graves and corrals with scatters of concave truncation burins. The site is about 1 km west of Site 88/1006 on a long ridge near the large wadi bed of al-Aiyne.

88/1008 This site is a chert outcrop with Jafr cores and a pre-Islamic inscription on a chunk of chert on a low hill immediately adjacent to Wadi Ruweishid, which here is very wide and tending north-west. The Jafr cores suggest that the outcrop was mined in the Chalcolithic period.

88/1009 This flint outcrop is situated on a high vantage point overlooking Wadi Ruweishid about 2 km north of Site 88/1008. It was used as a knapping site in the Early and Late Neolithic and to extract tabular flint for Jafr cores in the Chalcolithic. There are traces of early corrals and stone circles. A modern grave had been built using a pre-Islamic burial mound. There are several pre-Islamic inscriptions and a small desert mosque. The chipped stone included blades struck from bipolar cores.

88/1010 This rock outcrop with stone corrals is on the slope below Site 88/1009. A scatter of concave truncation burins was noted, and the corrals were reused relatively recently.

88/1011 This site consists of a collection of small corrals about 10 m in diameter on a slope overlooking Wadi Ruweishid about 1 km west of Site 88/1010. The scatter of flints includes concave truncation burins.

88/1012 This is a cairn of uncertain date on a hilltop. It is surrounded by a scatter of flint which includes thick blades and tabular flakes, and appears to be a multi-period knapping site. There is also a desert mosque.

88/1013 This is a cairn on a hilltop with modern graves over a rebuilt pre-Islamic grave. There are pre-Islamic inscriptions, Jafr cores and some concave truncation burins, as well as some ephemeral structures.

88/1014 This is an area of deeply incised wadi bed with a *ghadir* and cliffs. There are stone circles on both sides of the wadi immediately adjacent to the *ghadir*. The circles are individual structures about 8–10 m across, two of which were reused as graves with mosques.

88/1015 This site is located on a hilltop away from the adjacent wadi, and there is an outcrop of excellent-quality fine-banded red flint which was not heavily exploited, perhaps because of its distance from the wadi. There is a modern grave with a desert mosque, some earlier structures, including stone circles, and a largely undiagnostic flint scatter and two basalt rubbers.

88/1016 This site, which is situated on a hilltop where the adjacent wadi narrows, must have been an important viewpoint. There is a pre-Islamic cairn reused as a modern grave, a pre-modern Arabic inscription, a desert mosque (Fig. 6.3) and some *wusūm*. A scatter of flint included a T-shaped piece.

88/1017 Sited on a bluff above a deep *ghadir* are a pre-Islamic inscription on a slab of limestone, a desert mosque, a modern Arabic inscription, one or two concave truncation burins, some tabular flakes and miscellaneous blades.

88/1018 This is a stone circle (Fig. 6.4) with a pre-Islamic inscription and some Jafr cores. There is also a triple line of stones destroyed by a later cairn, and some modern graves.

88/1019 This site is on a hilltop where Wadi Ruweishid is narrow and deeply incised. There are a few beduin tent sites, some burin scatters and some Jafr cores, as well as a hilltop grave (1986 inscription) with *wusūm* and two desert mosques, each with a slightly different orientation (Figs 6.5–6.6).

88/1020 This is a fairly unremarkable section of wadi with a surprising concentration of modern camp sites, a desert mosque, earlier corrals and flint scatters. The chipped stone collection includes 22 pieces on dark brown fine-grained Eocene flint and three flakes on fine-grained grey flint (Figs 6.7–6.8). A basalt hammerstone was also collected. There is one broken Jafr blade core 150 mm long. The blade core has a flat platform and a weathered cortical surface with two negative flake scars with large hinge terminations. The knapper unsuccessfully attempted to remove blanks from the ventral surface, resulting in a crushed overhang.

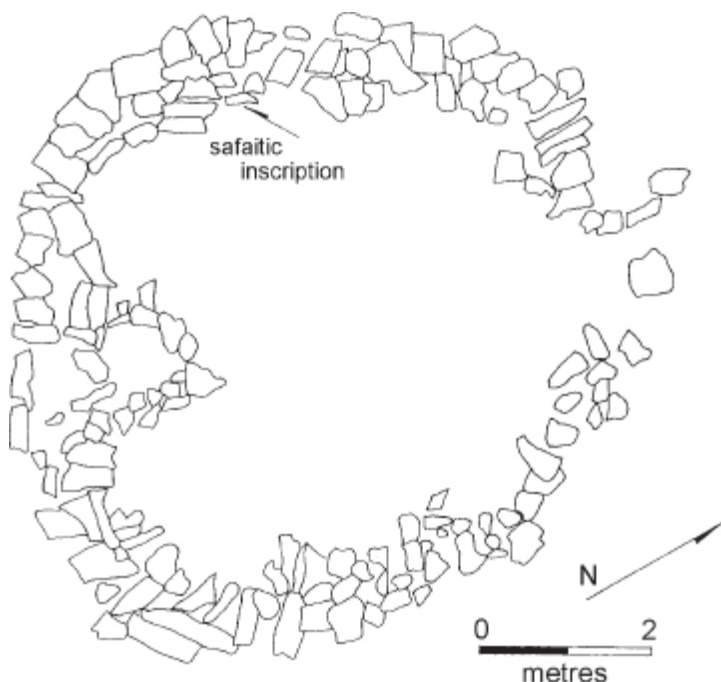


Figure 6.4 88/1018 stone corral

Seven blades are present in the collection, including one complete blade, three proximal fragments and three medial fragments. The butts all have flat, weathered cortical surfaces and two examples show some marginal faceting. Five of the blades are retouched into formal tools: a truncation burin, a burin-on-break, a denticulate, a notched piece and an end scraper. The two remaining blades have alternating short retouch. There were also three flakes on light grey flint, one a notched piece and one with inverse retouch. This collection finds its best parallels in the Jafr industries of southern Jordan (Quintero *et al.* 2002) and probably dates to the Chalcolithic or possibly the Early Bronze Age.

88/1021 This site is a modern cement building on a prominent hilltop with modern graffiti around the doorway and front wall.

88/1022 The unusual features on this site consist of a double line of limestone blocks facing roughly east with a cleared area in front. There is a series of these features on an open area of flat ground between Wadi Ruweishid and Wadi Tarafi.

Ruweishid al-Qisb (RQ91)

Intensive survey was carried out in a selected area of the wadi systems of the Ruweishdat to study site location in relation to landforms. The area selected was a sharply curving section of quite narrow and relatively deeply incised wadi. There were *ghudrān* in the wadi bed, areas of flat river terrace and low limestone cliffs with small caves and rock shelters. The location was heavily used by modern beduin and in the recent past, with indications that some of the tent sites pre-dated

the widespread introduction of the truck to the *badia* (Table 6.1). Pre-truck tent sites can be simply identified by their location in areas inaccessible to vehicles owing to rocky slopes or boulder scatter.

RQ 1000 This is a stone burial cairn ringed by a circle of large limestone boulders. At the centre was a stone cist orientated north-east/south-west which was covered by a mound of smaller limestone cobbles (Fig. 6.9). The cairn was excavated, but no traces of a burial or grave goods were found in the cist.

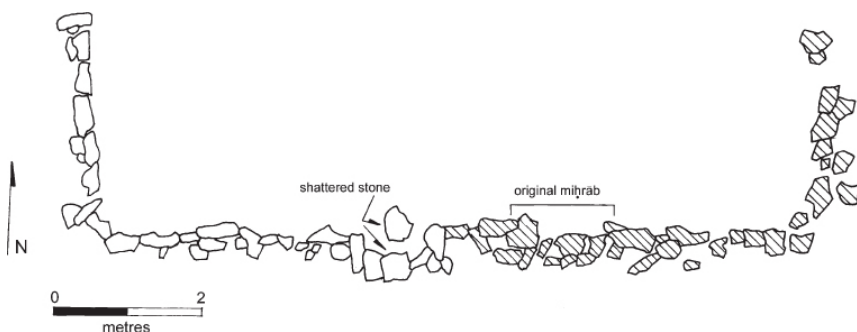


Figure 6.5 88/119 desert mosque

RQ 2000 Dabba Ridge The collection consists of five flints including one core, two blades and two flakes. All the flint is dark brown and fine grained. The cross platform core has flakes taken off one platform and blades off the other, and appears to have been used as a massive side scraper in more recent times, as indicated by the lack of patina on the flake scars. All of the blanks are retouched and have large bulbs of percussion. One flake and one blade exhibit cortical butts, while the rest have faceted butts.

RQ 2000 Wadi Ridge, Central North Some large black heavy burins and one T-shaped piece were collected from this locale (Fig. 6.10). The latter was made on an older large cortical flake of dark brown fine-grained flint and formed by three large abruptly retouched notches. The proximal notch was retouched on the ventral face while the two lateral notches were retouched on the dorsal face. Fine secondary retouching and crushing appear within the notches. There is little sign of use on the three points of the piece.

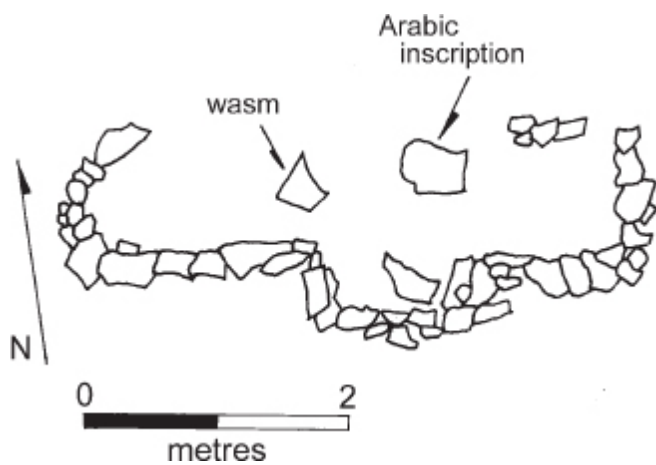


Figure 6.6 88/119 desert mosque

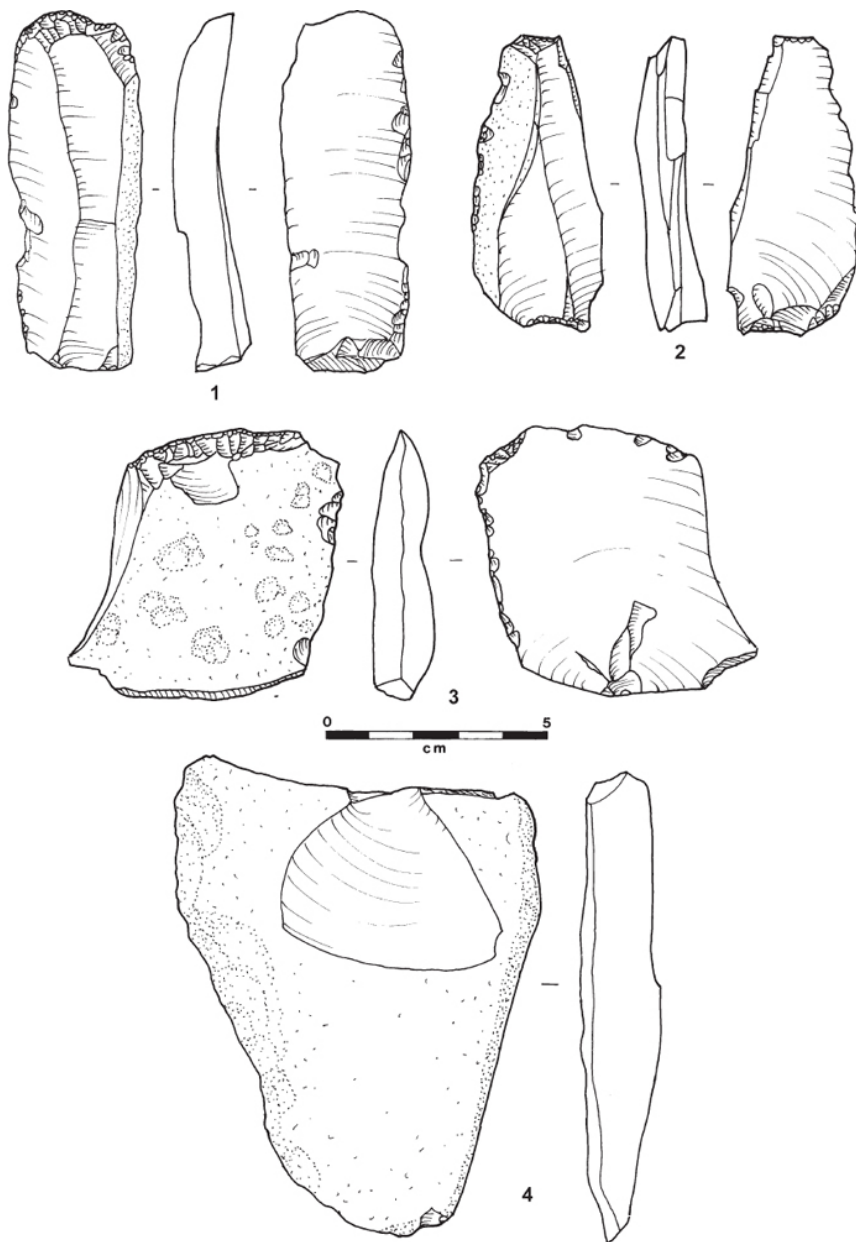


Figure 6.7 88/1020: chipped stone. 1. End scraper on blade; 2. Concave truncation burin; 3. Tabular scraper; 4. Jafr flake core

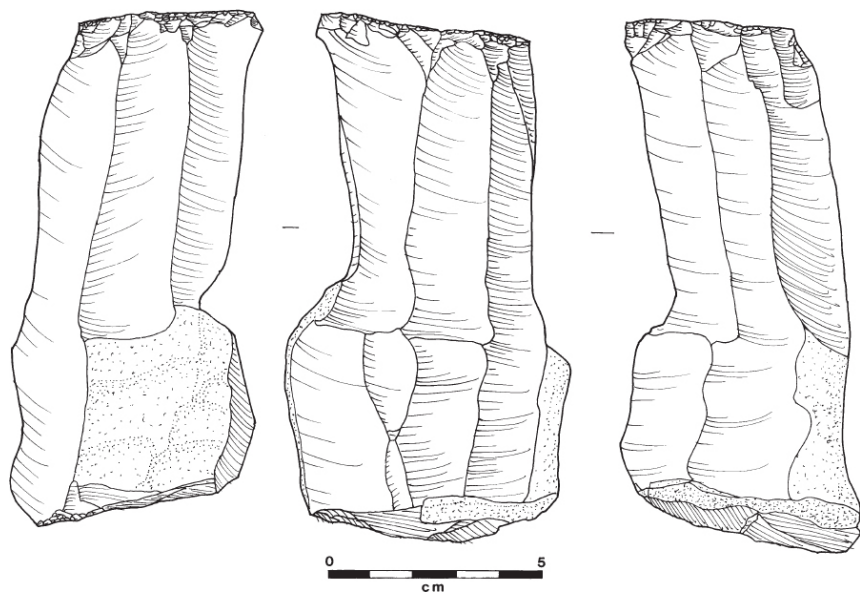


Figure 6.8 88/1020: chipped stone. Blade core



Figure 6.9 RQ 1000 stone burial cairn

RQ 2000 Wadi Ridge, North End A small number of large dark grey burins and some large dark miscellaneous flakes were collected.

RQ 2000 North Flood Plain, Tent Site The collection from this location includes some large flakes and chunks and some long blades. The flint used was black and dark grey.

RQ 2000 The Island A few medium to large grey flakes were found at this site; they included cortical flakes, one possibly Chalcolithic/Early Bronze Age tabular scraper and a T-shaped piece.

RQ 2000 Wadi Ridge North At this site the small collection of artefacts included some large black burins, some blade cores, some large flakes and some

thick blades.

RQ 2000 Central Ridge (C) This collection includes some large black flakes and some blades.

Ruweishid as-Satih (RS91)

This is an area where a tributary wadi enters one of the main wadis of the Ruweishdat system. There is a *ghadir* in the adjacent wadi, with ancient corrals and hut circles in the tributary wadi on the east-facing slope.

RS1000 A 3×3 m trench was excavated in one of the stone circles. The fill, consisting of fine sandy soil with some very small nondescript flint flakes and chips, was very shallow. Irregular clusters of small rocks may have indicated poorly defined internal features.

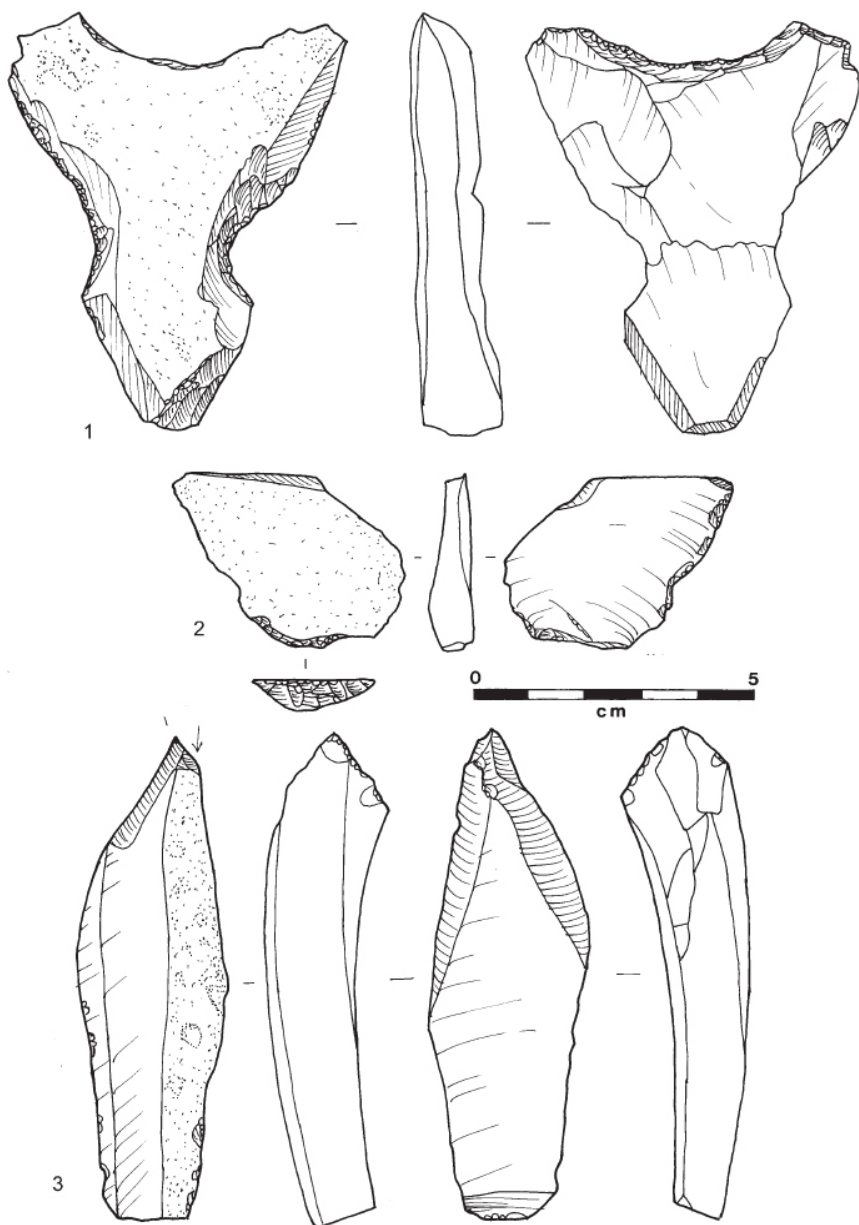


Figure 6.10 RQ 2000: chipped stone. 1. 'T'-shaped piece, the island; 2. Tabular flake with faceted platform, Dabba ridge; 3. Dihedral burin, wadi ridge, central north

The chipped stone collection consists of 34 lithics, predominantly debitage. Most of the flint is coarse grained with poor flaking properties. The debitage is flake-based. The collection includes a single platform flake core with a cortical platform.

Three formal tools were identified: a truncation, a notch and a borer. The remaining lithics include two retouched flakes and one retouched blade. There are no clear diagnostic pieces in the collection, but its expedient nature may suggest a Late Neolithic date for the site. This notion is supported by the surface collection from the site, which recovered a further ten items: one burin on concave truncation, one side scraper, one distal biface fragment, four retouched blades, two retouched flakes and one opposed platform mixed flake/blade core. The biface fragment appears to have been foliate in form and has covering scalar retouch. The symmetrical lenticular cross-section is consistent with axe typology. The axe exhibits a bending break. All lithics are made on medium to dark-brown fine-grained flint. The collection is comparable to that of Jebel Naja, suggesting that the site is Late Neolithic.

RS2000 This site consists of two corrals on the north side of a wadi (Fig. 6.11). The corrals are each about 10 m across and are located in a sheltered spot just under the exposed wadi cliff. Rocks to build the corrals would have been obtained from the scree slope and rubble that had fallen from the cliff above. This type of corral cluster and the location closely parallels sites in the eastern Bayir region of southern Jordan dated to the Chalcolithic period (Tarawneh 2007). Surface collection recovered undiagnostic flints.

Sector 3

88/3001 Rujm ad-Dumeithat There are a *ghadir*, a *birkeh* (man-made pool) and some graves at this location.

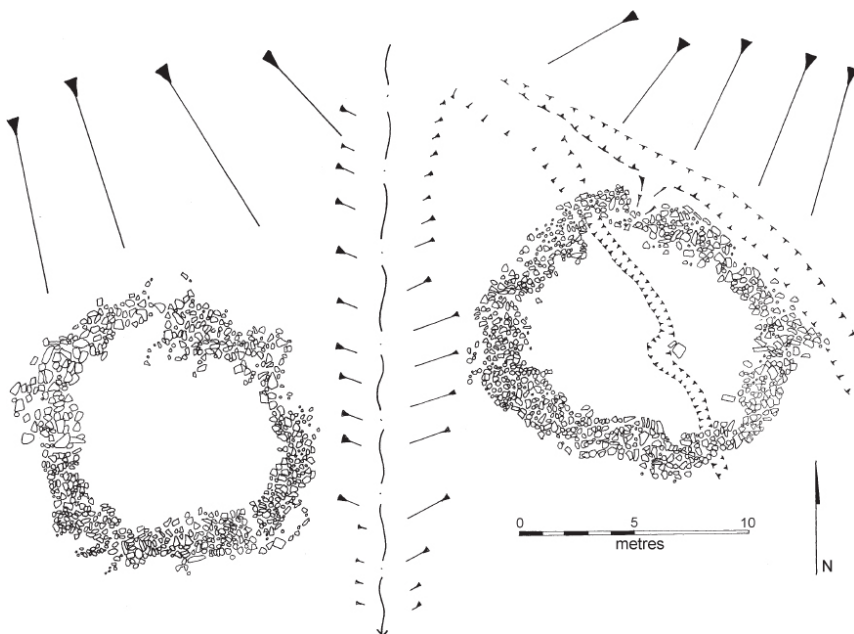


Figure 6.11 Ruweishid as-Satih (RS) 2000 stone corrals

Top shed metal bracket create stand
 Flange shoe of feed sack
 Rubber for lining in raft on site
 Rifle cartridge shell case (spent)
 Strips of recycled tyre rubber (feed bins?)
 Waste fragment
 Rusty metal tin
 Broken metal garbage can
 Rags from old goat's knotted rope
 Engine brake fluid, crushed
 Bracket (from vehicle?)
 Rubber blow plastic tyre of vehicle
 Rag from old hat garment, perforated
 Paper object vehicle bracket
 Scrap metal of hinge knitted fabric
 Windshield wiper plastic bags metal
 Ramp filter (from vehicle)
 Powdered milk packet fragment
 Fragment of silver plastic
 Oil filter tin
 Thick black plastic or ber × 2
 Small bags made from knotted rag × 3
 Socket box
 Sleeve of garment cut off for hobble
 Small metal fragment
 Base of oil pump used for a stove heating
 Wind blown polystyrene
 Plastic jar top (funnel?)
 Fragment of plastic screwtop container

Table 6.1 Ruweishid al-Qusb (RQ) food plain: finds from abandoned camp sites

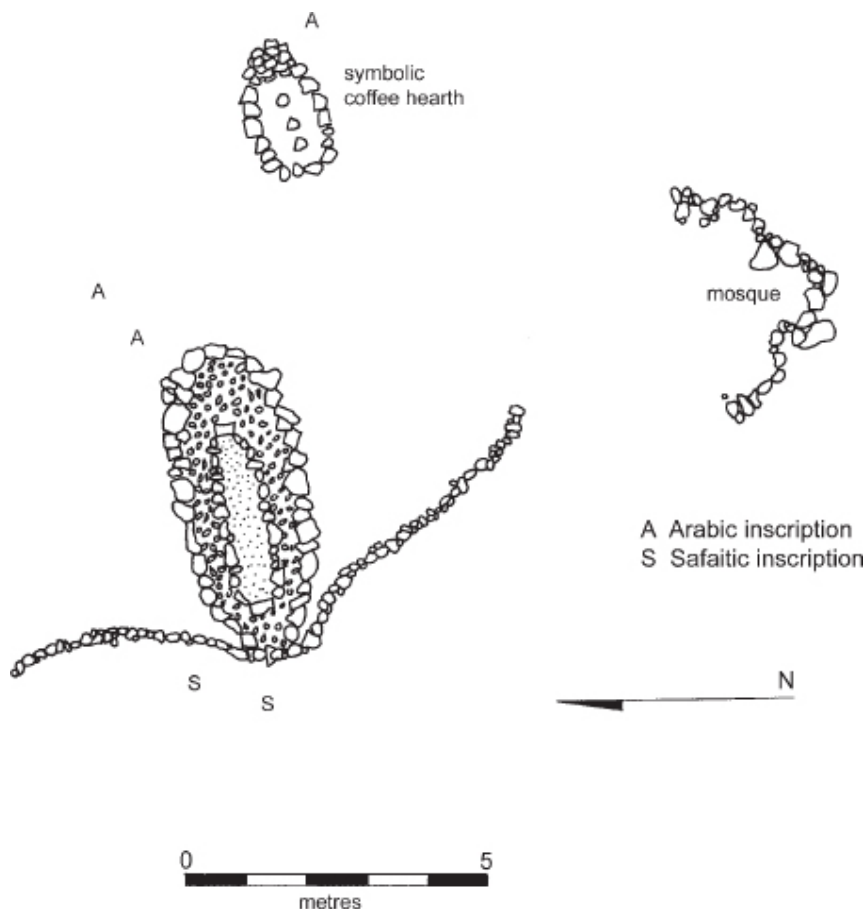


Figure 6.12 88/4001 Ahl al-Jebel grave

88/3002 This site is on a low rise created by a natural limestone outcrop. There are three recent graves, a small undiagnostic flint scatter (the first one found in the area), and a basalt quern fragment from an old beduin camp site.

88/3003 Tell al-Hibr 1 Tell al-Hibr is a basalt-capped outlier from the basalt massif and a prominent landmark in the south-eastern *hamad*. There are large numbers of pre-Islamic inscriptions and corrals, as well as graves cut into the soft limestone outcropping below the basalt.

88/3004 This site is located on a low rise near Jebel Jathum. There are pre-Islamic inscriptions, truncation burins and chalcedony debitage, probably from the Hibr outcrop.

89/6 This site consists of a cairn with some graves and one glazed sherd.

89/7 Tell al-Hibr 2 This site is an outcrop of creamy and buff-coloured chalcedonic flint with an extensive knapping site. Twenty-one pieces were collected, all made from the local very fine-grained chalcedony. The collection

included 12 small cores (10 single platform and 2 crossed platform), all of which have weathered cortex with battered and rolled edges, indicating that the raw material was available only in small cobbles. All have numerous removals and most show multiple knapping errors such as hinge and step terminations, which probably resulted in their discard. There is no evidence of platform preparation, but most cores show faceting or abrasion along the overhang; 10 cores have cortical striking platforms and 2 have plain/flat striking platforms. One tool was made on a small flat chalcedony pebble with steep retouch which has formed it into a lenticular shape. The remaining lithics consist of non-formal tools, 6 retouched flakes and 2 retouched blades. All the flakes have prominent bulbs of percussion, wide and thick butts and no lipping, suggesting that they were produced by hard hammer percussion. While there are no formal tools in the collection that could be used to assign a relative date, the reduction sequence at Hibr 2 is typical of the PPNC or Late Neolithic period. Chalcedony was especially prized in the Late Neolithic for the production of transverse arrowheads, and was also popular in the Natufian, but there is little indication of Epi-Palaeolithic blade technology in the assemblage.

89/8 This site comprises a scatter of hut circles very similar to those at Qa' al-Ghirqa in the *harra*. The lithics collection includes 375 items and is typical of sites of the 'burin Neolithic'. Numerous types of flint are present, including high-quality chalcedony very similar to that from the outcrop at Hibr 2 and dark brown fine-grained flint. The formal tools are dominated by burins (n=77), particularly truncation burins. There are also numerous borers, notches, denticulates, truncations, drills and scrapers. Two foliate biface fragments were identified, both of which have covering scalar retouch. Four projectile point types included two Haparsa points, one Amuq point and one transverse arrowhead. One of the Haparsa points has covering scalar (ventral) and sub-parallel (dorsal) retouch, while the other is only minimally retouched, with short dorsal removals. The transverse arrowhead is made on a flake with abrupt dorsal retouch forming the tang. The body and tip of the Amuq point is formed by sub-parallel dorsal retouch with bifacial covering retouch forming the tang. Nearly half of the collection consists of non-formal tools, including 148 retouched flakes and 16 retouched blades.

89/9 Khabrat Abu Hussein This site is on a low hilltop overlooking the mudflat and consists of a Natufian lithic scatter around a cairn. The collection includes a large number of chalcedony cores (Betts *et al.* 1998, 32–3).

89/10 Qa' Abu Hussein This site is on a low basalt hill at the west end of the mudflat and includes an Ahl al-Jebel tomb, a small undiagnostic flint scatter and some pre-modern corrals.

Sector 4

88/4001 This site is a modern Ahl al-Jebel tomb on a basalt promontory at the north-east end of Khabrat as-Samrin (Fig. 6.12).

88/4002 This collection of Safaitic inscriptions is on a cliff top overlooking the gorge where a wadi cuts out of the *harra* onto open ground west of Khabrat as-Samrin.

88/4003 This site consists of a cairn on a promontory with Safaitic inscriptions.

88/4004 This site is a small scatter of undiagnostic flints on a cliff top.

88/4005 This site is a cairn with Safaitic inscriptions on a low basalt promontory overlooking a grazing area.

88/4006 This site is a PPNB camp site on a kite wall at Bir al-Ghusain which consists of a small elongated pile of basalt rubble running along the wall. There are also some heavily weathered ostrich carvings on the stones making up the kite wall. The location of the site on a kite wall is identical to that found at the PPNB hunting camp of Dhuweila, on the TAP Line within the *harra* to the south-west (Betts *et al.* 1988).

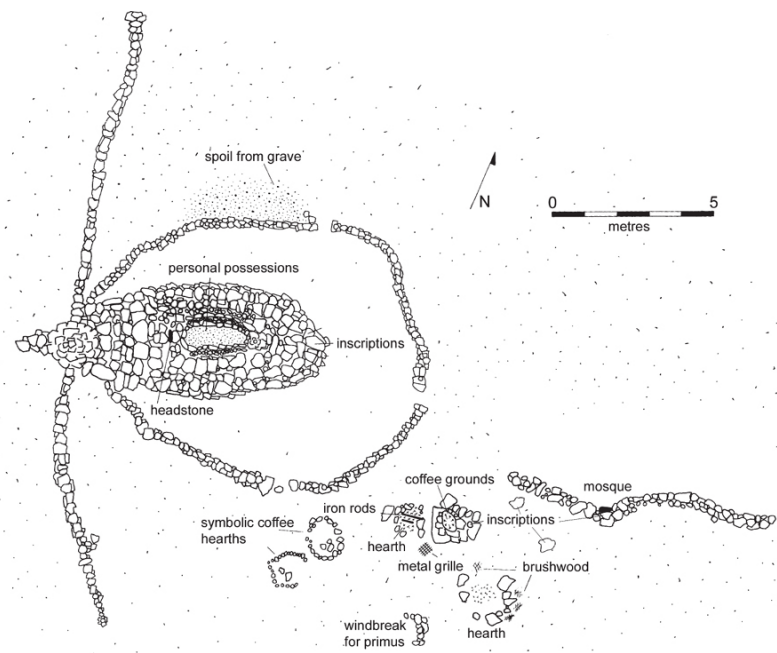


Figure 6.13 89/14 Ahl al-Jebel grave

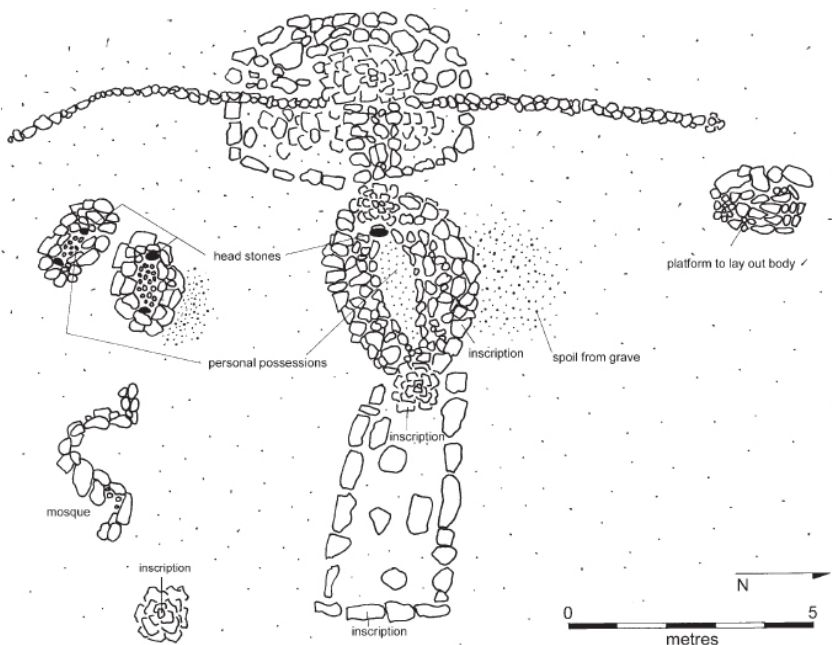


Figure 6.14 89/18 Ahl al-Jebel grave

89/14 This is a very elaborate Ahl al-Jebel (Ashrafat) tomb on a basalt promontory overlooking Wadi Mgat. The whitewashed grave is surrounded by symbolic coffee hearths and a mosque (Fig. 6.13). The grave had been visited recently by relatives, who cooked a hare on a metal grill over the hearth, boiled up a primus, built a fire (possibly for warmth), and poured coffee over the stone. The hearth and primus were sheltered from a cold east wind (late March). The following items were recorded on and around the grave: behind the 'wings' were a string bath glove, a red and white *kaffiyeh*, a woollen quilt, a foam mattress, a cotton shirt, a black and white *kaffiyeh*, worry beads (broken string) and an acrylic blanket; on the cairn were a *thaub* and a grey *aba*; on the tomb were two blue enamel coffee pots, a length of home-made webbing, pages from a very small copy of the Koran, five coffee cups, five tea cups, a glass tumbler, a ghee tin, a tobacco pouch, a strike-a-light, two *khanjars* (one with belt), two 50 fils coins, a broken plastic water bottle, a broken plastic water jug, incense resin, a key on a keyring, a razor handle, a razor blade packet, a complete razor, a pipe tamper, a tent needle, a broken mirror, two purses, a single bead, broken green glass, a scent bottle, a broken scent dispenser, an agal, an empty Gold Star cigarette packet, a gas lighter, a nit comb, an ordinary comb and a pipe bowl without a stem; on the cairns at the head and foot of the tomb were stocks with rags and scarves attached; on the ground around the tomb (possibly blown off) were a red and white *kaffiyeh*, a broken *ibrik*, and a broken plastic water bottle.

89/18 This is an Ahl al-Jebel grave on the edge of the *harra* between Mgat police post and Burqu' (Fig. 6.14). Two smaller graves lay to the south. The

following items were recorded on and around the graves: main tomb: a tin opener, two tin cans, one metal cup and scraps of rags/clothing at the head, including a *kaffiyeh*; central tomb: no personal possessions; south tomb: a blanket, nylon woman's underpants, coloured cloth (floral and patterned), a child's vest, a baby's feed bottle, stained white cloth (possibly nappies), a child's T-shirt, and a bar of soap. There were four inscriptions: barely legible Arabic; a *wasm* and possible name; names and dates; and a *wasm*.

Sites and land use in the eastern *badia*

The open limestone country to the east of the *harra* lies on the watershed between the Euphrates and the Jordan. Its dry landscape and flat horizons encourage people to move swiftly across it, but it is of limited value for settlement, either short- or long-term. While the Rwala have dammed wadis and pumped water to provide limited agricultural land in the immediate vicinity of their sheikhly settlements (*cf.* Helms 1990), this practice is costly and essentially unsustainable. The area also has a number of artificially constructed water systems including the (probably) Byzantine and the later modern dams at Burqu' and the early Islamic *mahāfir* at ash-Shahami and elsewhere (Betts *et al.* 1990; Betts 1993b).

Based on evidence from scatters of chipped stone, prehistoric use of the *hamad* is quite limited by comparison with that of the basalt *harra*, an environment which provides better shelter and a much more extensive supply of seasonal water sources in the numerous *ghudrān*. Late Neolithic flint scatters are quite strongly represented, which suggests a movement by Late Neolithic people into the region and the subsequent introduction of herding into the steppe economy. Despite their highly diagnostic lithic assemblages, early Neolithic (PPNB) sites are extremely rare. Their contrasting proliferation in the broken landscape of the *harra* reflects the focus on hunting there, an activity which would have been a much more challenging one in the wide open spaces of the *hamad*. The extent to which the region was used in the Chalcolithic is harder to determine. The Jafr industry, which has been identified with the Chalcolithic in the Jafr Basin (Quintero *et al.* 2002), appears to be represented to a limited extent in the *hamad*, but it is then hard to explain why there is almost no trace of this type of industry in the assemblage from al-Hibr. From the Chalcolithic onwards, the material remains are so ephemeral and undiagnostic that, despite a variety of sites of differing ages, it is very hard to postulate even a relative date for most of them.

Types of sites fall into a limited range of categories. Cairns were built for a variety of purposes, but most commonly for graves. Animal corrals, sometimes with windbreaks for humans attached, were built in sheltered locations in the deeper wadis, near to sources of water. Tent sites were located in similar places, while small scatters of stones on the open plains of the watershed may have been camps for camel herders, who had brought their animals for the new grass which flourishes on dew trapped between the fine grains of windblown sand strewn across certain areas there. Whoever stopped there apparently did not erect tents and did not require immediate access to water. In an effort to gain a full understanding of the land-use potential of the region, the survey recorded sites of all periods; however, for the area covered there were not a great number of sites, a fact that reflects the difficult nature of the region. Nevertheless, in spring and early autumn the area is an important source of fresh grazing, and up until the present

day large flocks of sheep, goats and, to a lesser extent, camels, can be seen there. In summer the land dries out and most herders retreat to the edges of the arable land, while in winter the open plains offer little protection from the bitterly cold winds that sweep the region.

Ethno-archaeological studies of traditional lifestyles have much value for our understanding of past societies, and this is particularly true of the Middle East (e.g. Cribb 1991). While the available data on eastern Jordan has not been used specifically in this study to analyse the archaeological evidence, the work carried out by the survey in documenting modern graves (Figs 6.12–6.16) and discard patterns at recent beduin camp sites (Figs 6.17–6.20) is of value in its own right and will be presented here as part of an overall picture of land use in the region through time.

The lake at Burqu' is used primarily by the Rwala, but at any time that water is available a wide variety of different groups come there to obtain supplies for their flocks. During the field season of September 1989, up to a hundred trucks a day were coming to the lake to obtain water, among them Shammar, Rwala and Ahl al-Jebel who were camping west of the pools and grazing their sheep on the eastern margins of the *harra*. Water was being transported up to 120 km into Saudi Arabia, where, in 1989, there was more grazing but no water. The Shammar were formerly camel herders whose territory includes the Jezireh, eastern Syria, western Iraq and northern Saudi Arabia. The Ahl al-Jebel have always been sheep and goat herders with a much more limited range centred around Jebel ad-Druze and the *harra*. They rarely camp far beyond the eastern edge of the *harra*, which was, historically, their refuge: Gertrude Bell records an encounter with the predatory tribe just north of Qasr Burqu' in which 'a dozen men [came] galloping or running up, some shooting, all shouting, half dressed – one of them had neglected to put on any clothes at all – with matted black locks falling about their faces. They shrieked and leapt at us like men insane' (Bell and Bell 1939, 309).

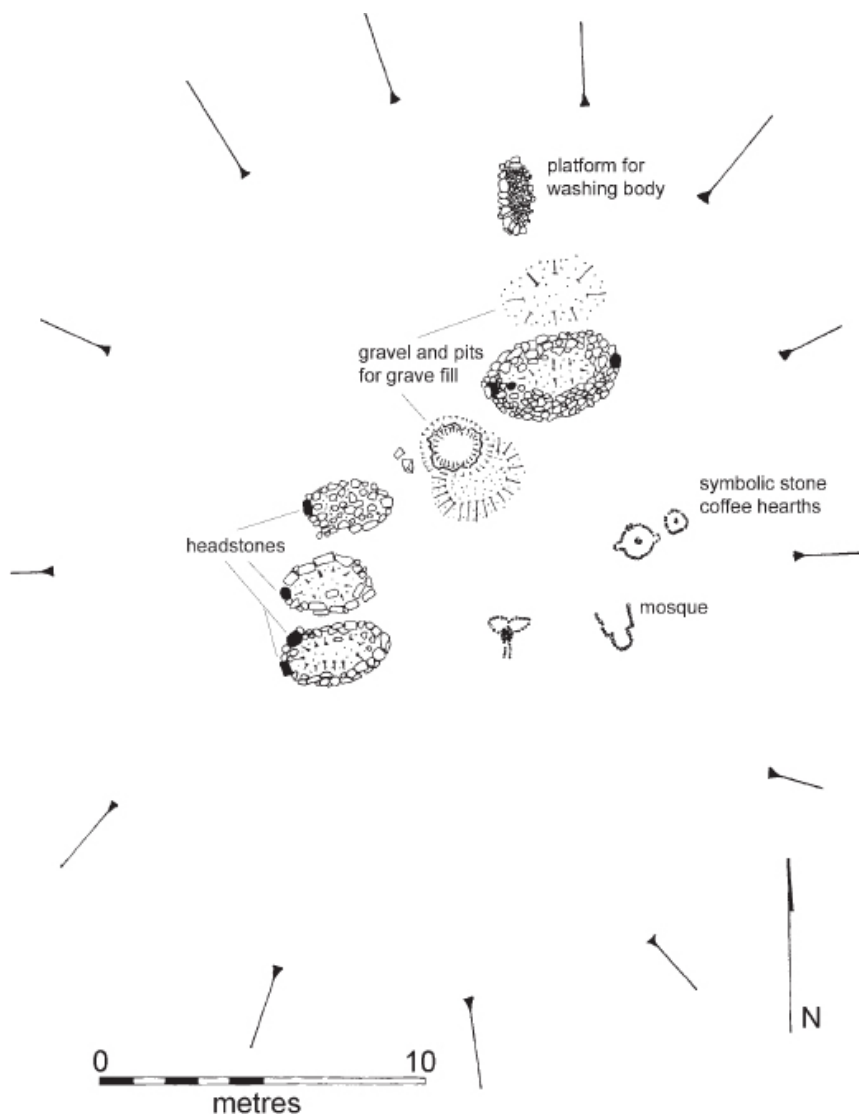


Figure 6.15 Ruweishid al-Qisb. Ahl al-Jebel graves

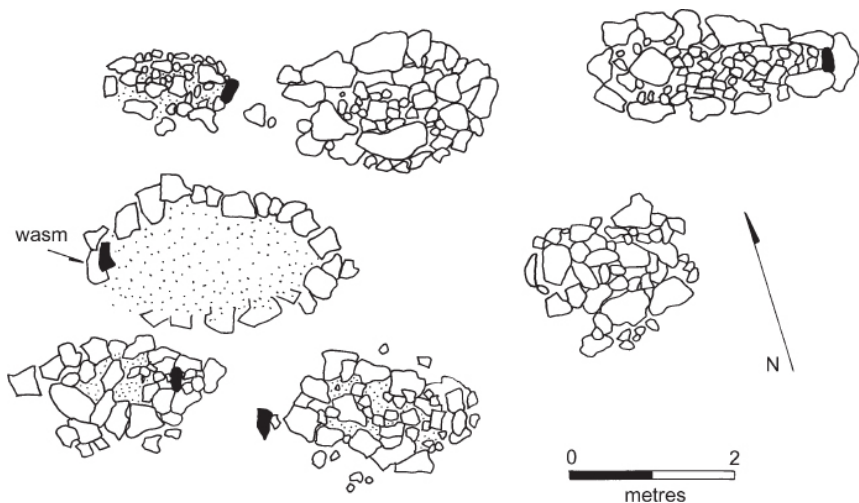


Figure 6.16 Section of graveyard at Burqu'

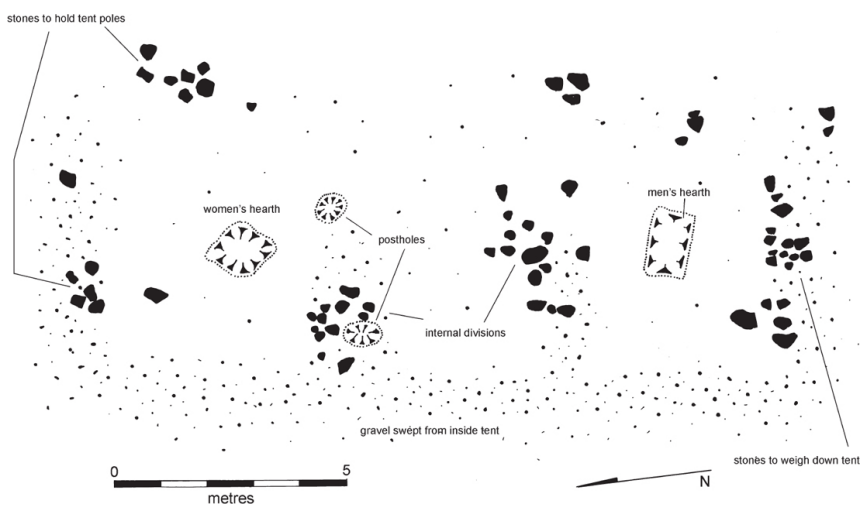


Figure 6.17 Wadi Jilat: abandoned beduin camp site

The Ahl al-Jebel camped at Burqu' in 1989 were al-Ghaiyyath, a separate tribe of the Ahl al-Jebel who are mostly Syrian, but who are no longer allowed into Syria for political reasons. Other visitors were some Frejje, a branch of the Rwala, coming up from Saudi Arabia for water, one man of the Howeitat up from Wadi Sirhan gathering information, one or two families of the Shararrat collecting water for sheep, one large herd (c. 400) of Rwala camels and a small group of Solubba herding about 150 camels and some sheep in the Dumeithat and coming up to Burqu' for water. The number of visitors was so great that there was a permanent encampment of Badia Police at Burqu' to prevent water disputes and to stop animals from being watered directly from the pool. In the 1920s, there was a battle between the Rwala and the Shammar over water rights at Burqu' during which a stray bullet hit and killed a Rweyli woman, compelling the authorities to move in to secure the peace.

Further east in Wadi Ruweishid the Ahl al-Jebel and Rwala were also watering at modern wells. Until the 1920s raiding was prevalent in the whole region and no beduin would camp near major water sources, but now that raiding has ceased they will camp near the water if grazing is also available nearby. Until the 1970s they could only camp as far from water as their flocks could walk, but with the introduction of the truck the preference now is to seek out grazing wherever it might be and bring the water often long distances to the herds. The effect has been to create serious overgrazing, as no area of land is ever left undisturbed for a season or more, and the vegetation has no chance to regenerate.

At the camp sites across the *hamad* the beduin make use of older stone corrals to protect their flocks or build new ones either of stone or of wire and stakes. Sheep and goats should be packed close together when they are corralled for warmth. Goats, particularly, need shelter in cold weather, especially from wet winds, but in pre-modern times herds tended to be comprised of up to 50% goat because they milk more and longer (Lancaster and Lancaster 1991). Sheep were usually kept for trading and for their wool. Very small corrals, 2–3 m across and covered with a cloth, were used to fatten ram lambs for slaughter. More open corrals were used for lambing and weaning lambs. The pre-modern corrals were also used for protection against wild animals at night. Nowadays the only, fairly rare, predators are hyenas and jackals, so that corrals are used and constructed on a less regular basis.

Apart from herders, there are also other occasional visitors to the eastern *badia*. In spring professional cheesemakers come out from the towns and camp with the herds to process the milk and take the cheese back to sell in the urban markets. In the autumn it was common to encounter hawk hunters around Burqu'; again these were townspeople from Saudi Arabia or just from H4/Ruweishid. The price for a peregrine falcon in 1988/89 was around 50,000–70,000 dinars, making their pursuit a potentially lucrative activity. The Saudi hunters, who camped in *hindi* tents on high, open ground, hunted the mature birds during the migration season by releasing pigeons with snares attached to their backs. The hawks would swoop, become entangled in the snare and the weight of the pigeon would gradually bring them down to earth. The hunters chased the birds in 4WD vehicles, often causing some damage to the vehicle and occasionally themselves during the chase. Most were heavily armed and did not appear to respect greatly the beduin code of behaviour.

The tent and domestic space

Housing and domestic shelters in eastern Jordan take a variety of forms. While few of the population are now fully nomadic throughout the year, a considerable proportion live in tents for part of the year, or maintain a tent as an annex to their houses. Several abandoned camp sites were studied in some detail, and Figures 6.17–6.20 illustrate some of these. Three of the camp sites are from outside the survey area but are included here to illustrate the archaeological ‘footprint’ of these sites. They demonstrate the gender-specific nature of waste disposal and clustering related to activity areas. For comparative purposes, the desert police camp at Qasr Burqu’ was also planned (Fig. 6.21). This shows similar concern for protection from wind and the positioning of waste and water supplies, but reflects the single-gender, hierarchical status of its occupants, with attention to defence and authority.

The beduin tent, *bayt al-sha’ar* (house of hair), consists of strips of goat-hair cloth, sewn and pinned together to form a rectangular shelter set against the prevailing wind. The roof is made up of strips of goat-hair cloth about 0.6–0.8 m wide sewn together to run the length of the tent. Most roofs are made up of six or eight strips, half on each side of the centre ridge. The roof may be protected from wear by wooden sockets or sticks above the centre poles and below the cloth. At the lines of greatest strain, bands of cloth about 120 mm in width are sewn to the roof from front to back, running over the sockets and poles. At each end are wooden fittings which rest over the outer tent poles and provide a point of attachment for the guy ropes, which provide sufficient tension to hold the tent in place. Guy ropes are fixed into the ground by metal rods and sometimes weighted down by sacks of stones to provide extra tension (Weir 1976). Along the edges of both roof and back there are often narrow strips of poor-quality cloth which are fastened together with wooden or metal pins to attach these portions of the tent to one another. The sides may be an extension of either the roof or the back of the tent. A lighter strip of fabric, sometimes cotton patchwork or hessian, is usually pinned to the front to provide shade and privacy, but is often left partially open to allow access and to let in air. The tent is normally divided internally into two or three sections, often by a decorative strip of woven cloth or patchwork. Tents vary in the number of centre poles they have, two or three being most common. The space between the poles varies also, but is usually between 3 m and 4 m, so that a two-poled tent is 9–12 m long. The width of the tent is usually 3.5–4.5 m (Weir 1976, 1–3).

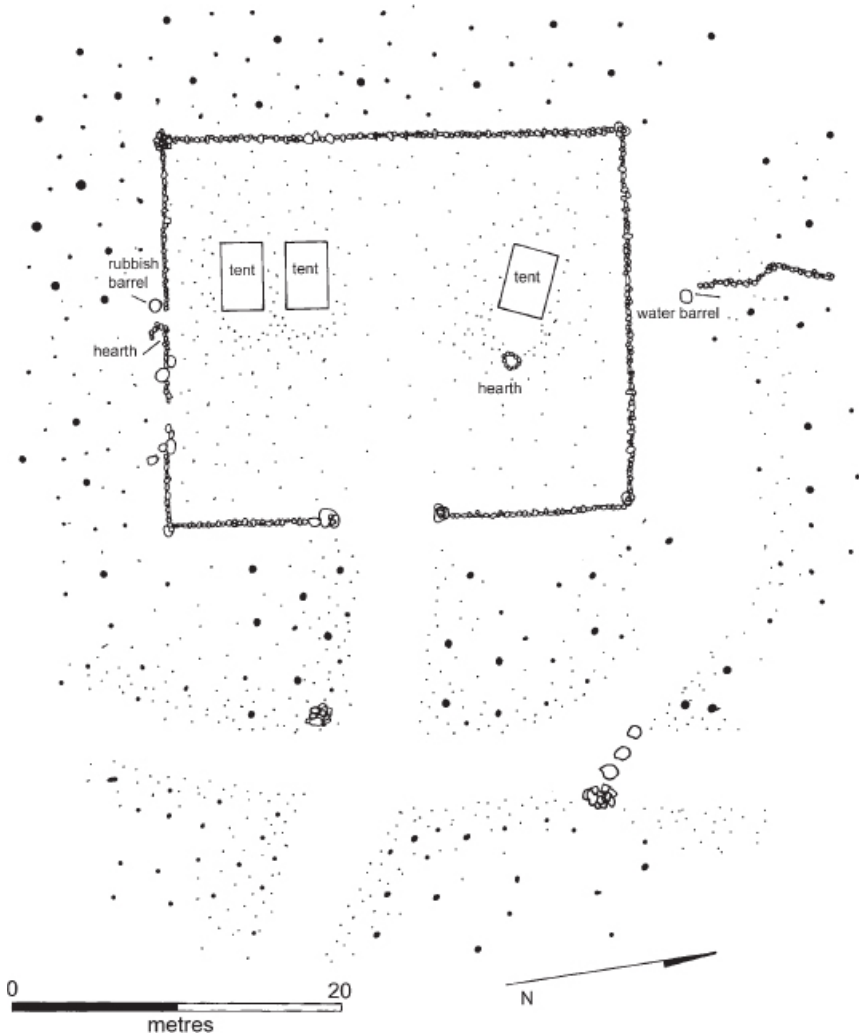


Figure 6.21 Burqu'. Desert police outpost

A man normally moves into a tent of his own when he gets married. The inhabitants of a tent are usually a nuclear family plus an elderly female relative, the mother or an aunt of the husband. The internal divisions of the tent provide distinct areas of activity, divided largely by gender. In the men's section, most commonly the right-hand side, senior males receive visitors and entertain guests. The women's section is restricted to women, children and immediate male relatives; here food is prepared and the family spend the night.

The focal point of the men's section is the hearth. This is usually a rectangular hollow sometimes lined with clay or stones. Here men make coffee and tea for guests. Coffee is made by roasting green beans in a large metal ladle, pounding

them in a wooden mortar and boiling the grounds with a small amount of water in an elaborately shaped pot. It is drunk from small cups with no handle. Tea is prepared by boiling water in a teapot, adding sugar, reboiling and adding the tea leaves. The mixture is brought to the boil once again and left to stand. Tea is served in small glasses, and is sometimes flavoured with cinnamon, mint or other herbs and spices. The men of the family and their visitors sit on mats, with folded mattresses or cushions to recline against.

The women's section is used for the storage of bedding, food and personal possessions. The rugs, mattresses and quilts used for sleeping are stacked up against the dividing wall of the tent. A rounded hearth near to the entrance is used for cooking, particularly for the preparation of bread, which is made by placing a thin disc of unleavened dough onto a curved metal tray above the fire. The bread cooks in seconds, and is used as a scoop for food in place of utensils. All meals are taken with bread.

Where sheep and goats are kept, the women also milk the livestock. Milk is preserved by turning it into yoghurt. For long-term storage the milk is separated to create clarified butter. Yoghurt is also dried into a form of very hard salted cheese. This is normally reconstituted for cooking by crumbling the small balls into hot water.

Rubbish from the tent is cleaned out regularly and usually deposited at either side of the tent. These rubbish heaps reflect the different activities of each section of the tent. Since much of the waste consists of ashes which may blow back into the tent in a wind, stones may be laid over the rubbish heaps to keep the waste in place.

The area outside the tent is usually cleared of large stones, and some domestic activity takes place here: women may set up their looms, animals may be tended, and repairs carried out to equipment. Waste from these activities is often cast out beyond the cleared area, forming a secondary ring around the front of the tent. External storage areas are placed at either side of the tent. Items here may include spare tent fabric, animal feed, large water containers and other bulky objects. Today vehicles are kept and repaired in the areas around the front and sides of the tent, but usually beyond the guy ropes.

Camp sites are often along the lower slopes of wadis, where a slight elevation provides drainage and grazing is available on the flood plain. Winter sites are chosen for their shelter, while early summer sites are in higher and windier locations. Seasonality can also be inferred by factors other than location. Winter camps may have drainage channels behind the tents and piles of stones for holding down tent walls and ropes in bad weather. Spring sites can sometimes be identified by stone platforms outside the women's side for the preparation of dairy products.

Herding and economic activities

Beduin of the Badiyat al-Sham today herd sheep and goats. Camel herding is relatively uncommon. The pattern of the herding year relates to the pattern of rainfall and vegetation growth, with the availability of pasture dictating the breeding cycle. In eastern Jordan, where rams are not separated from the flock, mating takes place in July and August. The gestation period is five months. Traditionally, the flocks leave the *badia* in May to feed on the stubbles of the agricultural areas, so in July the sheep are still in good condition. At this time,

after conception, sheep can be kept at low nutritional levels because the foetus is slow to form initially, but it then develops rapidly in the last third of the gestation period. The animals are moved back out to the *badia* in early autumn, where they have the benefit of dew-fed grazing, and they are ready for milk production at the time of maximum forage. Goats appear to follow a similar breeding pattern, but their oestrus cycle is more flexible than that of sheep (Lancaster and Lancaster 1991, 129). The general trend for herders is to go east and south in winter and spring and north and west in the summer.

Sheep and goats are often herded together, as there are several benefits to keeping a mixed flock. The feeding habits of goats and sheep differ in that sheep prefer to graze annuals although they will browse, while goats prefer to browse perennials although they do graze. The favoured grazing for sheep in the *badia* would be in spring, with the growth of annual vegetation, while goats are suited to longer periods of herding from the autumn dew-fed perennial growth through into early summer. Traditionally, herders provided goats with shelter in bad weather and at night, and with sheltered slopes for grazing. Now that sheep are kept in the *badia* the whole year round, the animals are provided with shade during the heat of the day and are taken out to graze during the cooler hours of the evening.

When lambs are young the flocks are separated for part of the day. The healthy adult animals are taken out in the morning by a shepherd, usually with a donkey. They are led through grazing areas and may be watered around midday. They are then rested for a couple of hours, led back through grazing areas to the camp in the cooler hours of the afternoon and watered again in the evening. Young lambs are kept by the tent during the day, either under tents or in small enclosures. Recently lambled ewes are herded separately from the rest of the flock. They suckle their lambs for a short period in the early morning, go out to graze, return at midday for the lambs to feed again, graze in the afternoon and return to suckle the lambs in the evening.

Shelter is important for the animals in winter and early spring. The type of shelter provided depends on the location of the camp site, the materials available and the composition of the flocks. In the *harra*, corrals are used for sheltering animals; those in present or recent use in the *harra* stand on the edge of *qi'an* or *shaib* at the bottom of the slopes. They are built of basalt cobbles and face east or south-east, providing shelter from the prevailing westerly winds while allowing the morning sun to warm the animals after the chill of the night. Sometimes existing corrals are used, sometimes corrals will be rebuilt or repaired, and sometimes they are not utilized for this purpose. Usually there are one or two large corrals with small pens built against the inside walls near the entrance, or against the outside walls, and often there are one or two smaller high-walled pens near the large corral, which are for goats and kids. Sometimes there are single or double pens for individual animals and their offspring. Goats, kids and lambs are penned at night, while sheep may or may not be put into a corral, even if one is available. Often sheep sleep around the corral or the tent. As well as providing shelter, corrals are used to prevent straying when pasture is abundant.

Use of large corrals reflects the number of goats kept as a main herd animal, or a preference for using a corral for sheep. Use of small, relatively high-walled corrals implies small numbers of goats as part of a mixed flock. Small, low-walled corrals are used for small batches of lambs or kids; the relatively large number of these at

any site indicates the care taken to have young animals on clean ground to avoid parasite infestation. Small pens are also used for storage and to shelter camels with young.

The association of corrals with tent sites that is so characteristic of the *harra* is not present in the *hamad*. On the fringes of the *harra* there are some corrals, but in the wadis of the Ruweishid complex corrals are relatively uncommon, occurring only with outcrops of limestone. These examples are usually smaller and lower than those of the *harra*. There are also lines of stones laid out in lines and semi-circles that may be used as shelters for animals or for small tents. More recently, pens of barrels and wire netting were used to provide shelter for and containment of sheep and goats, and small ones held supplies of animal feed. Today, small single-pole tents made of old feedbags are put up in front of the main tent to house young animals, sheep and goats that have recently given birth and the rest of the flock.

Beliefs, traditions, and burial customs

According to the tenets of Islam, graves are unmarked; however, in practice, this rule is rarely adhered to strictly. Most beduin graves in north Arabia are simple. A hole is dug and the body laid in it on the right side, facing Mecca. The earth is put back and the resulting mound is covered with stones to prevent animals from disturbing the body. Sometimes a large stone is placed at the head of the grave and, less commonly, a smaller stone at the foot. In some cases, the *wasm* of the deceased is carved nearby, or on one of the stones covering the grave (Figs 6.15–6.16).

The ordinary graves of the Ahl al-Jebel follow this basic outline, but they are often rather more elaborate (see Figs 6.12–6.15) (Lancaster and Lancaster 1993). The earth mound is surrounded by stones laid one or two courses high, and the stones over the mound are themselves covered over with gravel. There is usually a headstone, and frequently a footstone as well. Most graves have a *wasm* carved on one of the stones on the grave, or nearby, by visitors, while the *wasm* of the deceased is usually carved on a stone forming part of the cairn. In some cases these graves, sited on hilltops and promontories, have been further elaborated into large tombs with ancillary structures. In basic form they remain the same, but the wall around the mound is built up to about 1 m in height and the top corbelled over. The headstone becomes a cairn about 2 m high, although the footstone is sometimes absent. Spreading out from the cairn are walls which gently curve towards the tomb rather like protective ‘wings’. These walls are about 4–5 m long and about 1 m high near the tomb, decreasing in height towards the extremities. They are not as carefully built as the drystone wall around the mound, and are usually only one stone thick. The clothing and bedding of the deceased are laid on top of the tomb, a common practice said to be done for the benefit of the itinerant poor, but in practice probably reflecting a desire to dispose of items associated with the dead person. On these elaborate graves other objects are often left as well, including items such as razors, medicines, tapes, coffee cups, teapots and other domestic paraphernalia.

Ancillary structures are often associated with these tombs. The most common structure is a ‘desert’ mosque, which consists of a line of stones one course high with a *mihrab* in the centre to indicate the direction of Mecca. The *mihrab* is often

built of slightly larger stones and there are usually short side walls at either end. The praying area thus delineated is carefully cleared of stones. It is noticeable that the mosque is nearly always situated on the southern side of the tomb, the side nearest to Mecca. A similar relationship (between tent and mosque in this case) can be observed at Ar-Risha, where a concrete mosque was constructed just outside and to the south of the sheikh's guest tent.

The other common ancillary structure is a circle of stones about 1 m in diameter which is placed fairly near the foot of the tomb, also on the southern side. The side of this circle furthest from the tomb is often built up to two or three courses high, or the circle is built up against a large boulder on that side. Within the circle are two or three roughly upright stones about 0.2 m high which are surrounded by a variable number of small round stones, with a small pile of similar stones placed on the edge of the circle. Sometimes there are more than one of these structures. By the end of the northern 'wing' there is occasionally a stone platform for laying out the body, backed to the west by a low wall. Spoil from the grave is always placed on the north side of the tomb.

In all cases these tombs are associated with inscriptions. Besides *wusūm*, the name of the deceased and the date are usually carved on a rock nearby. Other names, presumably those who helped to build the tomb, are often similarly carved. Further names are inscribed on suitable rocks in the vicinity with a date later than that of the interment. Typically these inscriptions are carved by near-relatives of the deceased, often the son. Normally the tribal affiliation of the deceased is given in one of the inscriptions, but this is not always the case.

The most recent tomb recorded was built in 1986, and it was possible to find out more about the significance of their construction from members of the Ahl al-Jebel in the area. They explained that it was simply one of their customs to build such tombs, but they were able to explain the symbolism behind the structures themselves. The elaborate tombs and cairns were ordinary graves on which more effort had been expended. The mosque was built nearby for prayers at the time of the burial and for the convenience of anyone who subsequently visited the grave. The 'wings' represented the house or tent of the deceased and the small stone circles represented hearths, with the larger stones being coffee-pots and the smaller ones the fuel, which in this area is usually dung. These tombs were built not for sheikhs or tribal leaders but as memorials to men who had high personal reputations and who were noted for their generosity. One or two tombs of this type were also built for women. These funerary monuments were also provided if the deceased had a reputation as a healer. On such tombs scraps of paper from medicine wrappers were inserted among the stones, and it is known that the tombs of healers were visited by people who were ill or who had sick relatives.

The practice of visiting such tombs appears to be quite distinct from the practice known elsewhere in the Muslim world of leaving offerings of money, food and scraps of fabric at tombs believed to be those of 'saints'. Such tombs are often simply those of sheikhs or men of prominence who were accorded a more elaborate burial. In many cases such tombs acquire a status quite distinct from the status of the deceased in life. This practice is recorded in, for example, the Middle Euphrates region among the 'Agedat:

Le Šēh Wardi est considéré comme un saint et son tombeau est visité, comme la plupart des tombes de ceux qui ont mérité le titre du šēh. Ces tombes sont une simple turbe de

pierres au pied de laquelle se trouvent une ou deux petites auges destinées aux offrandes: menue monnai, poule, grains, destinés au premier besogneux qui passera ... (Charles 1939, 89)¹

Close to the lake at Burqu' is a graveyard, reflecting the extensive use of this water source by beduin through the ages. A section of this burial ground was studied and planned (see Fig. 6.16). The graves, which are low mounds of earth and gravel surrounded by a ring of largish stones, are aligned almost east-west. Most are covered over with smaller stones, but one is covered instead with gravel. Five of the seven graves studied have an upright stone at either the head or the feet, but only one of these is marked in any way: the stone marking the gravel-covered grave has a *wasm* carved on it. This grave is fairly recent, and may be an Ahl al-Jebel grave, as this type of gravel covering occurs on other Ahl al-Jebel graves elsewhere. The other graves are probably Rwala, as the Ahl al-Jebel were not burying at Burqu' until the late 1970s.

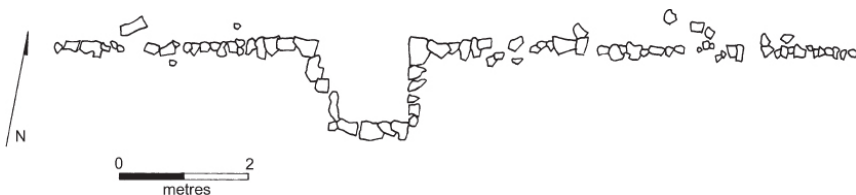


Figure 6.22 0000 desert mosque

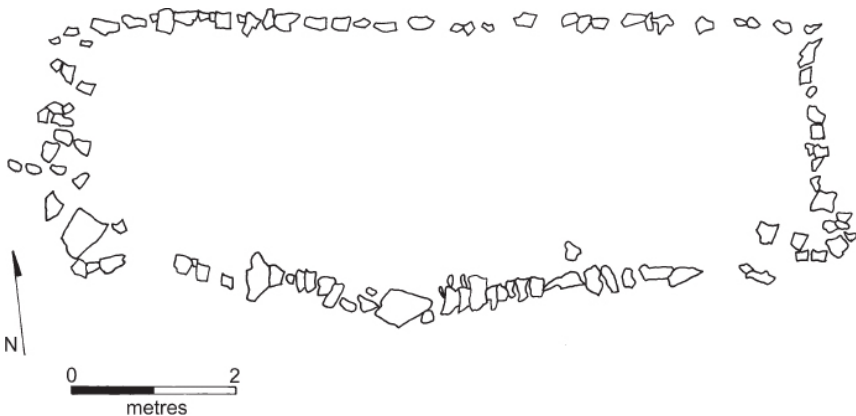


Figure 6.23 0000 desert mosque

Mosques were also found without any visible association with graves. They were usually placed on hilltops, sometimes with more than one in approximately the same location. Like those beside 'winged graves', isolated mosques consist of simple lines of stones delineating a cleared area, with a *mihrab* set into the centre of the main wall. Some had inscriptions in Arabic and *wusūm* carved on stones set into the wall (see Figs 6.3, 6.5–6.6; Figs 6.22–6.24).

The present day

Since fieldwork took place at Burqu' in the late 1980s and early 1990s, land use in the *badia* has experienced yet another shift. The first Gulf War, which interrupted fieldwork in 1990, did not greatly impact the region, although the area was used for secret troop landings. The flood of refugees crossing into Jordan brought with them a variety of communicable diseases which were spread in particular across the eastern *badia* owing to the presence of large holding camps at Ruweishid and near al-Azraq. Amoebic dysentery, which until then had been fairly rare in Jordan, became endemic to the country in the following years. Hepatitis also became more prevalent. At least partly as a result of the hostilities, borders that were once only loosely policed became much more restrictive. A fence was constructed along the ditch bordering Saudi Arabia, limited the casual northward drift of Saudi beduin and itinerants that had been normal in the past. It also prevented Jordanian beduin from following the grazing down into northern Saudi Arabia and accessing the markets there, and has impacted on the smuggling that has been a feature of the eastern *badia* for many decades. Political and economic shifts have had a more significant impact than military ones. The introduction of compulsory primary schooling for children has greatly reduced the number of young families camping in the *badia* in winter and spring, and the management of flocks has become an agro-industrial concern rather than one based on extended family control. The role of the sheikhs no longer requires them to maintain a personal presence in the *badia*, although the sheikhly settlements, such as Ar-Risha, are still in existence.



Figure 6.24 Burqu' 1400

NOTE

Sheikh Wardi is considered a saint and his tomb is visited, like most of the tombs of those who have merited the title of Sheikh. The tombs are a simple mound of stones at the foot of which are one or two small troughs intended for offerings: coins, a chicken, grain, intended for the first passer-by ...

7. The Eastern *Badia*

A. Betts and D. Cropper

The data presented in this volume add significantly to our understanding of the prehistoric occupation of the *badia*, revealing distinctive settlement patterns, site types and economic strategies over time. When this evidence is considered with that from Dhuweila and the sites at Wadi Jilat and Azraq Basin it is possible to explore differences in land use and subsistence practices throughout the arid zone. Finally, the prehistoric occupation in the *badia* is examined in relation to the verdant regions, with particular emphasis on the introduction of pastoralism.

Up until the last two decades of the 20th century the available evidence, or lack thereof, seemed to indicate a substantial hiatus in occupation in the southern Levant following the end of the Aceramic Neolithic. The reoccupation of some of the formerly abandoned settlements, as well as the establishment of new villages, was accompanied by apparently new cultural assemblages, including the use of pottery. The prevailing hypothesis was that the southern Levant was recolonized by people from the north. This hypothesis has been substantially challenged on the basis of excavations during the 1980s which have revealed cultural continuity on Neolithic sites in the southern Levant from the Pre-Pottery Neolithic into the Pottery (Late) Neolithic (Kafafi 1993; 2004; Rollefson 1993; see also Goring-Morris 1993, 66) and also along the Mediterranean coast (Gopher 1993; Galili *et al.* 2004). In the fertile zones, from sites such as 'Ain Ghazal, there is evidence to suggest major changes in the subsistence base. The economy rested on a combination of crop cultivation, herding of sheep/goat and supplementary hunting. Rollefson and Köhler-Rollefson (1993, 39; Köhler-Rollefson 1992) have suggested that, for 'Ain Ghazal, during the PPNC sheep/goat husbandry was disarticulated from the village setting, at least partially, and that the flocks were herded for protracted periods well away from the villages in order to alleviate local environmental stress. Overall, the Late Neolithic in the verdant areas saw the rise of smaller, more dispersed farming settlements in small valleys along the upper rim of the Jordan Rift Valley (e.g. Kafafi 2001), populated seemingly by

migrants from the older PPNB villages rather than by incomers from the north.

While remaining largely aceramic, sites in the *badia* exhibit similar evidence for cultural continuity through what seems to be a period of economic change. The evidence from the *badia* shows an apparent absence of occupation in the PPNA followed by a gradual move out into the steppe from the early PPNB onwards (Fig. 7.1). The early PPNB short-term settlement sites in Wadi Jilat, west of Azraq, were occupied by groups who depended primarily on hunting and foraging, but the sites also have evidence for domesticated cereals; domesticated sheep/goat appear on these sites by the PPNC/ELN period (Garrard *et al.* 1996, 214 ff.). Further to the east, hunting is the prime focus of LPPNB camps in the *harra* (Fig. 7.2), such as Dhuweila 1 (Betts *et al.* 1998), but by the Late Neolithic (Fig. 7.3) sheep/goat appear in significant numbers on sites at Burqu'. As in the fertile zone, there are clearly changes in lithic technology from the 7th to the 6th millennium. Flake technology becomes increasingly dominant, and there is a shift from bipolar blade production to a preference for unipolar blade and flake cores. Certain tool types continue throughout, most notably the concave truncation burin, while arrowheads show an evolution which exhibits overlap between PPNB forms and new Late Neolithic types (Betts *et al.* 1998, 95–101).

Late Neolithic sites in the *harra*

The Late Neolithic sites in the *harra* (discussed in Chapter 2 above) fall into two distinct groups. Most of the sites can be categorized as 'burin Neolithic' sites and are similar to Jebel Naja. They are located at the edge of the basalt, near flint sources. Their tools are large and there is a high proportion of waste material. Apart from concave truncation burins, the only other tools which appear consistently are foliate bifaces, tile knives, borers and drill bits on spalls. Late Neolithic arrowhead forms occur very rarely. The flint scatters may be associated with sub-circular enclosures, although the association is rarely clear, not least because the sites have seen frequent reuse up to the present day. Any structures would appear to be poorly and irregularly put together from easily available rocks. There is no obvious evidence for the upright slab technique found at, for example, Azraq, Wadi Jilat (Baird *et al.* 1992), Dhuweila (Betts *et al.* 1998) and Burqu'. Beads and evidence for bead-making are common to a number of the sites. The sites appear to have seen intermittent short-term occupation.

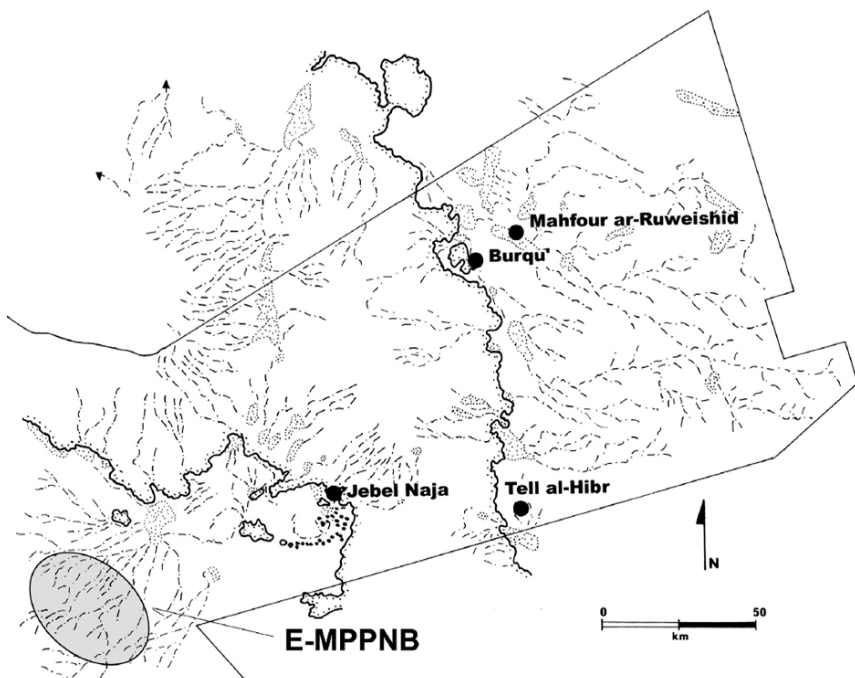


Figure 7.1 Distribution of sites in the eastern badia: E-MPPNB

There are few faunal remains at the 'burin Neolithic' sites, at least from the excavated contexts at Jebel Naja, but the scanty evidence overall suggests some herding activities. Bone debris is rarely found in the surface collections from other 'burin Neolithic' sites. This is not merely a result of prevailing conditions of preservation, as bone can be seen in surface collections from sites with faunal remains such as those at Burqu' and Dhuweila. The virtual absence of arrowheads and lack of wild fauna indicate that hunting was not a significant part of the subsistence activities at the site. The locations of Jebel Naja and the other sites of the same type also imply pastoralist activities. The sites are selected for their sheltered locations, which are protected from the prevailing westerly wind and overlook open areas where grazing would be available and animal movement simple. That this choice of site location was for pastoralist activities is underlined by the fact that these sites have been repeatedly reused by sheep-/goat-herding beduin up to the present day. The emphasis on shelter suggests seasonal occupation in the colder seasons, when water would be available and the grazing would be at its best. The choice of location on the margins of the basalt plateau differs markedly from that of earlier PPNB sites in the *harra*; these are found within the *harra* or on hilltops (knapping sites) around the periphery. The change in location strongly suggests a shift in emphasis from hunting to herding.

The second group of sites in the *harra* includes those in the vicinity of qa' al-Ghirqa and qa' Dhuweila. These sites are located well into the basalt and are defined primarily by their structures, which are diverse in form and construction

technique. The flint assemblages are characterized by the very small size of the pieces and the lack of waste material. The types and relative proportions of retouched pieces are similar to the other sites, although there is a slightly greater diversity of tool types, a lower proportion of concave truncation burins and a few more arrowheads. Beads and evidence for bead-making are also found. From the available evidence it is difficult to say whether the sites saw intermittent short-term use or were occupied for protracted periods of time, but the investment in construction implies that they were more than merely short-term camp sites. Test excavations at qa' al-Ghirqa revealed little evidence for occupation deposits, but the sites are built almost directly on bedrock and are quite heavily deflated; therefore, it is possible that there was once greater accumulation of occupational debris. The subsistence basis of these sites is not obvious. There are a few more arrowheads than on sites such as Jebel Naja and some bone fragments occur in the deflated surface deposits, but no faunal remains have been recovered for analysis. The sites appear to have been located with reference to the *ghudrān* in the wadis draining the mudflats. Their proximity to the large mudflats despite their locations on high ground suggests that they may have been occupied during periods of flooding, when large shallow lakes appear on the *qi'an*. In this respect they may be similar to Burqu', where longer-term occupation was related to proximity to water, either in the wet or the dry season. The small size of the flint tools also indicates fairly extended periods of occupation during which it was not considered practical or necessary to travel the 20 km or so to the edge of the *harra* to acquire fresh supplies of raw material.

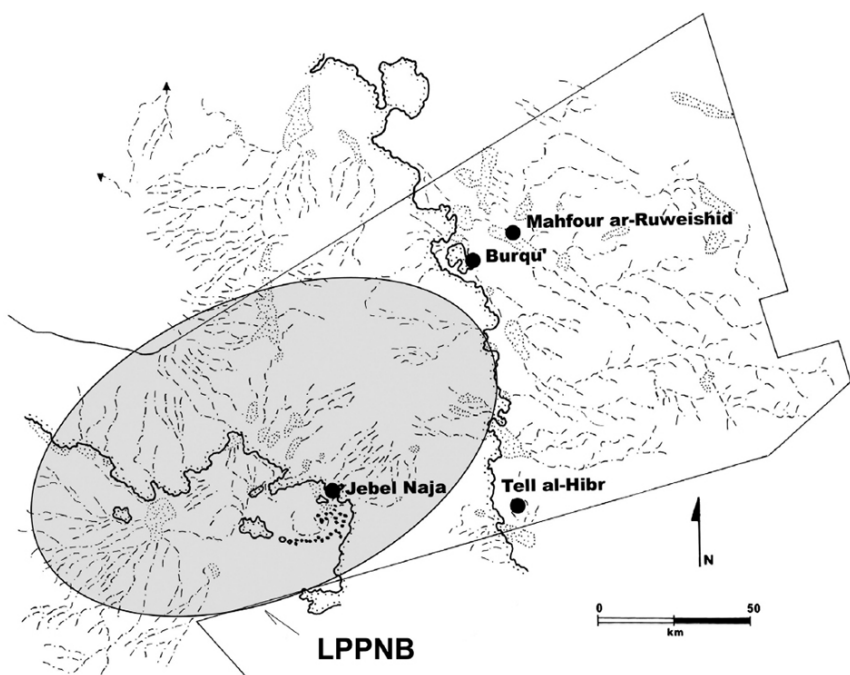


Figure 7.2 Distribution of sites in the eastern badia: LPPNB

Apart from the two types of Late Neolithic site discussed above, at least two other distinct variants of Late Neolithic occupation have been identified in eastern Jordan (Betts 1993a, 52): the Late Neolithic levels at Dhuweila (Betts *et al.* 1998) and the sites at Burqu'. Late Neolithic Dhuweila was a hunting camp set deep into the *harra*, with structures combining upright slab techniques with rough drystone walling. The faunal remains are plentiful and consist largely of gazelle; the flint assemblage includes large numbers of arrowheads, scrapers and knives, with dihedral burins dominating over truncation burins. It was also a processing station, with ground-stone slabs and rubbing stones. The sites at Burqu' have structures similar to those at Late Neolithic Dhuweila, but have faunal remains including both sheep/goat and wild species, mainly gazelle and equid. The chipped stone assemblages have few of the tabular scrapers and tile knives that are a distinctive feature of Late Neolithic Dhuweila, while truncation burins, although occurring in relatively low numbers, are the dominant type in the burin category.

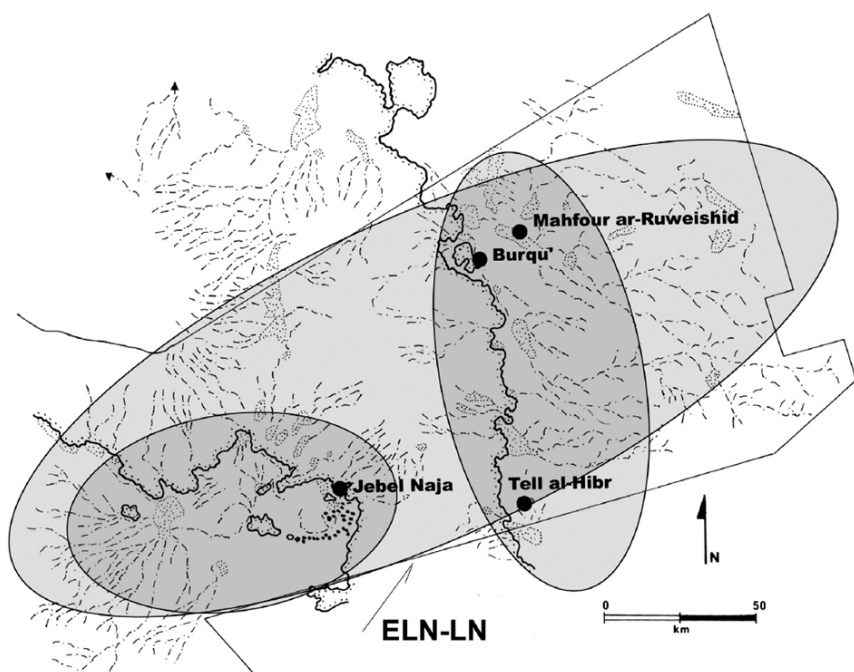


Figure 7.3 Distribution of sites in the eastern badia: ELN-LN

Of the four variants, the most common and widespread is the 'burin site', as typified by Jebel Naja. While the 'burin site' is a well-known phenomenon that extends over a broad area (for a full discussion see 'External relations', below), the function of burins and their preponderance at the eponymous sites remain debated. Baird (in Garrard *et al.* 1994b) has suggested that these high

concentrations of concave truncation burins represented sites where only a limited variety of activities was pursued. This seems a feasible explanation, given that the burins occur widely on sites across the *badia* in a variety of different Neolithic tool assemblages. Concave truncation burins occur on various different types of site from the mid-PPNB onwards (Baird 1993), but it is possible that sites such as Jebel Naja represent a specialized adaptation which did not become fully developed until the Late Neolithic. Yet, with the minimal evidence for subsistence practices at these sites, it is a major problem that the function of the key artefact, the concave truncation burin, is still a subject of speculation. Interpretations of site function are based on site location, limited faunal evidence and the relative absence of tool types other than burins. Attempts have been made to understand the significance of the concave truncation burin (Finlayson and Betts 1991; Baird 1993, 523), but with limited success. Microwear studies have shown that the burin facet was not necessarily the principal working edge; other edges were used in apparently random fashion and some examples show no use wear. Some burins were used as cores to produce spalls for use as drill bits for bead-making, but it is not clear whether the spalls were created as deliberate blanks or as accidental by-products of burin facet creation. While it is suggested that these sites are associated with sheep/goat pastoralism, the burins serve no clear function in this activity. One speculative interpretation, offered by Quintero *et al.* (2004, 209), is that the burin spalls were manufactured for use as teeth in combs for the harvesting of wool from sheep. Evidence from the 'burin sites' certainly supports the notion that the burins were used primarily as cores for the production of spalls. There are large numbers of burins, most with multiple spall removals, but far too few corresponding spalls, suggesting that the spalls themselves were removed for use elsewhere. However, their use as combs remains unproven at this stage.

Chronology of the Burqu' sites

Burqu' and its environs have been ecologically marginal for human occupation since time immemorial. There may have been periods when increases in rainfall permitted the growth of denser vegetation in the wadis, and certainly a time not so long ago when the steppe had not been reduced by over-grazing to desert, but, in general, the landscape is one that can support only a small, mobile population. Water has always been key to survival in the area and it is this that has drawn people to Burqu' over the millennia. An accident of topography has created a regularly forming rain pool that seems to have been more reliable than most in a land of uncertain resource supply. While no detailed hydrological studies have been undertaken, there is no superficial evidence for an underground spring supplementing the runoff that provides the water supply for the pool. Yet the archaeological evidence shows that, from the Epi-Palaeolithic onwards, people have been drawn to the shores of the lake to enjoy its waters.

Evidence from the three seasons of fieldwork around the lake has shown that there are traces of Epi-Palaeolithic camp sites near the lake. These are probably Natufian, but could be earlier. The PPNA is absent, as it is over most of the eastern steppe; no traces of PPNA use of the basalt region to the west of Burqu' were found during extensive survey of the region (Betts 1986). In contrast to the situation on the *harra*, the PPNB is also remarkable by its virtual absence. PPNB hunting camps and knapping sites are common in the *harra* (Betts *et al.* 1998), and it would be

expected that they might be found at Burqu'. However, traces of PPNB use of the *hamad* are extremely rare, so it appears that the PPNB hunters preferred to stay for the most part in the deep *harra*. The great change comes at the end of the Early Neolithic, from the late 8th millennium cal. BC, the equivalent of the PPNC of the verdant regions. It may be misleading to use the term PPNC for the Burqu' assemblages, which show distinct local characteristics and a slow developmental continuum. The terms Early and Late Neolithic are used for preference, with little to distinguish the division between one and the other save absolute dating and broad typological comparisons. The economic changes that begin to take place in the transitional period are reflected, following terminology used for Jilat and Azraq (Baird 1993), by the use of the term Early Late Neolithic rather than Pre-Pottery Neolithic C for this somewhat ephemeral phase. It is around the late 8th millennium to early 7th millennium cal. BC that camp sites begin to proliferate around the lake shores.

The earliest excavated site at Burqu' is 35000, which is also the site with the greatest depth of stratigraphy. Dates of 7440–6990 cal. BC were obtained from Phase 2, but few diagnostic artefacts were recovered from this level. The chipped stone from the upper three levels can be compared to the later phases of Site 03000 and the middle levels of Site 27000. Despite the relatively early date, there were no indications of naviform core technology. The earlier occupation at Site 03000 may be roughly contemporary with Site 35000. Its lowest levels yielded Byblos points in Phases 1 and 2, together with Late Neolithic forms such as Nizzanim points in the latter. Transverse arrowheads appear in Phase 3, while the only radiocarbon date for the site, 5890–5590 cal. BC, comes from a pit cut from the top levels of the same phase, placing the later occupation well within the Late Neolithic. Site 27000 probably begins a little later, with dates ranging from 6380 to 6000 cal. BC for the earliest phase. The flint assemblage contained no Byblos points, but both Nizzanim points and transverse arrowheads are present in Phase 2. Occupation continues longer than at the other two sites, as the upper phases, from 3 onwards, begin to show the appearance of truncated pebble flakes, a unique feature of the later Burqu' assemblages. Site 11000 had shallower occupation deposits and no absolute date was obtained from it. The flint assemblage suggests that it is probably contemporary with Phases 2 to 3 of Site 27000. Site 20000 was also shallow and yielded no dating evidence. The tool assemblage was limited, but the presence of Late Neolithic point forms and the absence of truncations suggest that it is probably best considered as contemporary with Site 11000. Site 02000 is clearly slightly later than the other sites. There are no dates, but the large numbers of transverse arrowheads and truncated pieces suggest that it may have been contemporary with the very end of Site 27000. The 02000 tool kit best reflects the deflated surface levels at Site 27000. By this time there had been a marked change in raw material procurement strategies, and tools were made either from poor-quality, locally obtained chert pebbles or fine-grained chalcedony nodules that occur in outcrops to the south of Burqu', including at Tell al-Hibr. Site 02000 may represent the end of the Late Neolithic or perhaps the transition to the early Chalcolithic at Burqu'. Site 18000 is more problematic. It was the only site to yield pottery, but this is undiagnostic. No radiocarbon dates were obtained for the site, but the chipped stone assemblage suggests that its earliest phases may be generally contemporary with Sites 11000 and 20000 and

the middle phases of Site 27000.

Economically, there was little change through time at the sites by the lake. The botanical evidence has yielded no evidence for seeds of any kind, cultivated or wild, but shows, unsurprisingly, the regular use of shrubs for firewood. This implies that the local environment did not support much tree cover, even in the wadi beds. The faunal remains show that from the earliest excavated levels sheep/goat are present in numbers representing a third or more of the total number of animals killed (Table 7.1).

External relations

As the peoples who visited the Burqu' lakeshore were clearly nomadic or semi-nomadic, the key question is the full extent of their pattern of movement. At one extreme they might have been villagers from the west who spent part of the year in the steppe and at the other they may represent a population living entirely within the confines of the steppe. The truth, as always, probably lies somewhere in between. The chipped stone assemblages provide the most reliable evidence for considering this issue. In the earlier assemblages technological trends such as the transition away from bipolar cores in the Late Neolithic reflect broad patterns across Levantine assemblages, although this change occurs slightly later in the steppe. The diagnostic projectile points are also indicative of wide regional trends, with a gradual shift from Byblos points through Nizzanim and Herzeliya points towards a dominance of transverse arrowheads. Again, this change takes hold slightly later in the steppe, suggesting that technological innovations take place mainly in the more verdant areas. The Badia point, however, hints at more local distinctions. These have been identified at Dhuweila in the *harra* (Betts *et al.* 1998, 95, 96, fig. 4.14) and occur at Wadi Jilat (Baird 1993, 122, fig. 4.2.5). They are also present at Um Dabaghiyah in the Syrian Jezirah (Mortensen 1983, fig. 3, a–d) and Tell Halula on the Middle Euphrates (Molist *et al.* 1994, fig. 8.7; fig. 9.2). It is possible that they do have a wider spread into the verdant areas but have simply been recorded as Byblos points there and not illustrated in publications; yet the evidence suggests that they may be a form specific to the *badia*. They may also be an indication of contact with the Middle Euphrates region. One Late Neolithic denticulated sickle blade from Site 11000 (see Fig. 3.36, 11) stands out as unusual, and clearly demonstrates links to the settled villages in the west. It is apparently not a traded item, as the raw material is the same as that used for other more common tools in the assemblage. On the other hand, the single obsidian bladelet from Site 03000 is a traded item, and should be of Anatolian origin, but its precise source has not been identified.

Site	NISP	Total ass	Sh/Gt		Gaz NISP	Sh/Gt %	Gaz %	Sh:Gt ratio	Dog NISP	N of taxa
			NISP							
Dhuweila 1	2786	18977	5	2601	>0.1	93	01:00	3	7	
Burqu' 35000	66	2685	9	34	14	52	n/a	0	5	
Burqu' 27000	260	4927	110	18	42	7	13:01	6	9	
Burqu' 11000	25	n/a	10	2	40	8	n/a	0	3	
Burqu' 20000	13	665	3	3	23	23	n/a	0	4	
Burqu' 02000	12	n/a	5	2	42	17	n/a	0	4	
Dhuweila 2	8418	47935	39	7917	0.4	94	03:01	15	12	
Burqu' 03000	237	5551	102	28	43	12	n/a	8	8	
Burqu' 18000	64	1914	4	43	6	67	n/a	0	8	
Tell al-Hibr	645	881	3	23	0.5	4	n/a	4	10	

Table 7.1 Summary of selected animal bone data from sites in the eastern badia

The single most diagnostic tool of the *badia* assemblages in general is the truncation burin, but its proportions vary greatly. In the sites to the south-west of the *harra*, such as Jebel Naja, truncation burins dominate overwhelmingly, but at Burqu' they occur in only modest numbers, if at all. At Site 03000 they are well represented in the earlier phases, and burins overall represent some 45% of the retouched tools from the site. At Site 35000 this figure drops to 30% and at Site 27000 to 17%. On the other sites, and in the later phases, truncation burins fall to single figures and then disappear. Baird (1993, 523ff.) has looked in some detail at the 'burin site' phenomenon, and notes that at Wadi Jilat significant numbers of truncation burins begin to appear from the Middle PPNB onwards. Further to the east they appear to be associated primarily with the Late Neolithic. Baird (1993, 524) notes that in the limited instances when 'burin sites' in the eastern *badia* can be dated, by point types or particular core reduction strategies occurring in well-stratified associations with burins, the indications are that the assemblages are Late Neolithic. He cites the examples of Jebel Naja, Palmyra 79 (Akazawa 1979) and Rutba (Nishiaki and Fujii 1986). While the spread into the deeper steppe seems to occur in the Late Neolithic as far as can be determined, it begins earlier on the periphery, not only in the west at 'Ain Ghazal and Wadi Jilat but also in the north at Umm el Tlel and Qdeir (Stordeur 1993, 195–6).

Baird (1993, 523) also stresses that, contra Betts (1987), the 'burin Neolithic' phenomenon cannot be seen as exclusively associated with pastoralism. This is true on more than one count, firstly since it has been proven that the phenomenon has its origins in the Early Neolithic, and secondly since it has become clear that, in discussing Late Neolithic animal management in the *badia*, it is more correct to talk of hunter-herders than of pastoralists (Martin 1999; Betts 2008). However, there is a general pattern where sites in the eastern *badia* with high proportions of burins are generally not directly associated with long-term water supplies. The sites are greater in number and occur further out into the steppe than those of previous periods, almost exclusively in locations preferred by more recent nomadic pastoralists. It might be suggested that if the function of the concave truncation burin is not directly related to pastoral practices then peoples who favoured concave truncation burins coincidentally took this preference with them as they adapted to a hunter-herder lifestyle and expanded further and further out across the steppe. On the other hand, Rollefson (1995, 517) suggests that a link does exist between pastoralist practices and the burin phenomenon, citing the absence or

rarity of burins on Late Neolithic farming sites such as Jebel Abu Thawwab and Jericho and the burin-rich assemblage of Yarmoukian 'Ain Ghazal, with its greater emphasis on pastoralism. This distinction is less clear-cut than it might seem, however, as at this period burins form 13.9% of all tools at Wadi Shu'eib, away from the edge of the steppe (Simmons *et al.* 2001, 11) and 16% of all tools at Umm Meshrat I, further into the good steppe than 'Ain Ghazal itself (Cropper 2006, 153). It may also be that the pastoral emphasis of the Yarmoukian 'Ain Ghazal population simply brought them into contact with the steppic populations so that shared lithic traditions developed over time.

In an observation that is pertinent to the discussion of external relations, Baird (1993, 524) also notes that the 'burin site' phenomenon is markedly localized. Since the distribution map published by Betts (1987), new fieldwork has provided proof of this. Sites with large numbers of concave truncation burins are apparently absent from the arid zone south of Wadi Hasa. None have been found in the Wadi Arabah or in the Hisma, nor have they been reported from the Negev and Sinai. Intensive survey around Bayir and the western Sirhan has shown them to be absent there also (Tarawneh 2007). To the west they occur up to the hills on the eastern side of the Rift Valley (Rollefson and Fröhlich 1982), and to the north they occur at least as far away as Palmyra. Burin sites can be found quite readily in wadis running down from the hills behind Palmyra (Cauvin and Cauvin 1993, 26; personal observation). To the north-east they occur around el-Kowm (Stordeur 1993; 2000) and in the Wadi Hauran (Nishiaki and Fujii 1986). There is also, however, a significant connection to settled sites in the hills east of the Jordan Rift valley. At 'Ain Ghazal, Rollefson (1995, 515–18) has documented a notable rise in the proportions of concave truncation burins from the Middle PPNB to the Yarmoukian. By contrast, in the el-Kowm oasis truncation burins are characteristic of the semi-nomadic occupations at the PPNC/Terminal PPNB Qdeir 1, but they are absent at the sedentary contemporary settlement of El Kowm 2 (Stordeur 1993, 195).

Towards the later part of the Burqu' sequence there is a noticeable change towards a very local lithic industry. Some specific tool types, such as the transverse arrowhead, can be found across the Levant, but overall the later assemblages, in their choice of raw material, technology and typology, become highly localized. Greater use is made of poor-quality pebbles from sources close to the lake, and the small truncated pebble flakes begin to appear. These truncated pieces appear to be a phenomenon peculiar to the lithic assemblages of the eastern *harra*, and have not been documented so far at sites in Wadi Jilat and al-Azraq nor at settlement sites further west. Similarly, there is limited use of the tabular scrapers that characterize the Chalcolithic elsewhere, including the southern *badia* (Tarawneh 2007), despite the fact that some Jafr core sites have been found in the *hamad*. This absence is particularly marked at Tell al-Hibr. In fact, the assemblage from al-Hibr can be placed within a relative dating framework only by reference to the Burqu' assemblages. Without these, it would be almost impossible to identify the assemblage in any meaningful way. The most diagnostic artefacts in this respect are the truncated flakes. The trend towards increased localism suggests a gradual severance of links with the more fertile regions and a population firmly rooted in the *badia* throughout the whole cycle of the seasons.

Beyond the chipped stone assemblages, other evidence for external relations

may be sought in the architecture and special finds from the sites. The architecture is relatively unhelpful in this regard. The shelters are sub-circular and built from local basalt cobbles. The combinations of construction techniques used at Dhuweila (Betts *et al.* 1998) can also be seen at Burqu'. Some walls are built using upright slabs which are occasionally sunk into small pits or depressions and supported by small rocks along one side of the base. Others are built of curving drystone masonry. There are occasional pavements made of basalt slabs. It is difficult to distinguish interior from exterior areas within what is generally a honeycomb of stone cells. The flat grinding slabs with a small central depression set into the pavement at Late Neolithic Dhuweila (Betts *et al.* 1998, 49, fig. 3.16 BA, 247, pls 5, 6) have not been found at Burqu'. The use of upright slabs is a widespread steppic phenomenon that occurs with some minor variants in the steppic limestone areas west of the *harra*. It has been well documented at Wadi Jilat and in al-Azraq (Garrard *et al.* 1994a). Further west, it also occurs in the Negev and Sinai (Bar-Yosef 1984; Goring-Morris and Gopher 1983) and south into al-Jafr (Fujii 2001, 31). It might be assumed that the stones supported a skin or brushwood superstructure. At Dhuweila and in Wadi Jilat occasional rectilinear walls hint at some connection to the architecture of the settled villages, but there is no sign of this so far at Burqu'.

The special finds offer some more useful data. Stone rings found at Site 03000 indicate an exchange network, perhaps to the west. The presence of the greenstone Dabba marble is definite proof of long-range movement or exchange into or from the west. Site 27000 yielded mother-of-pearl, dentalium and cowrie shells which probably followed exchange networks to find their way to Burqu'. They may have been sourced either in the Mediterranean or the Red Sea.

The *harra* and the *hamad*

Extensive survey throughout both *harra* and *hamad* is sufficient to draw some conclusions about land use through time across the region. In the west, on the edges of the *harra* to the east of al-Azraq oasis, there is a marked concentration of Late Neolithic sites with an overwhelming preponderance of truncation burins in the lithic assemblages, of which Jebel Naja is typical. The sites have been presented in some detail in this volume to demonstrate the uniformity in site location and lithic typology. Sites are amorphous conglomerations of stone circles that have been reused on a sporadic basis up to the present day. The locations are generally selected to provide shelter from the prevailing westerly winds, and tend to be on a slope at the margins of the basalt, overlooking open limestone gravel plains with wadis providing seasonal grazing.

Further into the *harra* are sites such as Qa' al-Ghirqa, located close to potentially significant seasonal water sources, with more elaborate architecture and a lithic industry that can be compared with that of the sites on the edge of the *harra*, but which are remarkable for the small size of their artefacts. The tool kits are slightly more varied, with a smaller proportion of burins. These sites have also yielded more beads and drills on spalls, but it is possible that this may be partly a function of their deflated surface deposits.

Deep into the *harra* are the hunting camps as illustrated by Stage 2 at Dhuweila (Betts *et al.* 1998). Here the lithic industry is greatly different from the other Late Neolithic sites. The assemblage from Dhuweila 2 is marked by the high quality of

raw materials and manufacture. The tile knives, foliate bifaces and tabular flake scrapers found here are very rare on sites such as Jebel Naja. Another marked difference is the dominance of dihedral over truncation burins at Dhuweila, with dihedral burins representing over a quarter of the total burin count. Overall, burins represent only 15% of the total tool assemblage.

On the eastern edge of the *harra* are the sites around the Burqu' lake. Again, these sites do not have high proportions of burins, while projectiles are well represented, but not overwhelmingly, in the tool kits. Further out into the *hamad* are sites where truncation burins dominate the assemblages, as well as Mahfour al-Ruweishid, which has more substantial structures and a more mixed tool kit.

In all cases the sites were used by mobile populations, although the length of occupancy at any one time may have varied substantially from site to site. Those located close to good water sources tend towards more substantial architecture and were probably used for longer periods of time. Those with a restricted range of tools, specifically sites such as Jebel Naja, are likely to have been short-term camp sites where a limited range of activities was carried out.

Subsistence strategies

For the sites in the eastern *badia*, reasonably substantial faunal and botanical evidence is available from Dhuweila, the Burqu' sites, Wadi Jilat and Azraq (Garrard *et al.* 1994a; 1996) and the sites in the vicinity of el-Kowm (Stordeur 2000). Botanical data from Wadi Jilat indicate the presence of a variety of domesticated cereals (Colledge in Garrard *et al.* 1994a; 100 ff.), while evidence from el-Kowm indicates the limited presence of cereals at Qdeir 1 (Stordeur 1993, 200–1). Further into the *badia*, cultivated cereals disappear. At Dhuweila only wild einkorn and wild barley were recovered (Colledge in Betts *et al.* 1998, 185 ff.), while no cereals at all were recovered from Burqu' (see Chapter 3, 'Botanical remains'). At all sites there was evidence for the exploitation of wild plants.

With regard to the faunal data, current available evidence suggests that sheep were first domesticated in south-west Turkey (Peters *et al.* 1999), the practice spreading out from there and southwards (Horwitz *et al.* 1999, 76). In the fertile regions of the southern Levant sheep are present by the late PPNB in significant numbers at 'Ain Ghazal, reaching a peak of 45% of the *Ovis/Capra* sample by the PPNC (von den Driesch in Horwitz *et al.* 1999, 71). Goats appear earlier than sheep in the southern Levant, although there is debate about whether or not they were originally domesticated there (Horwitz *et al.* 1999; Horwitz 2003). They are present at 'Ain Ghazal in small numbers from the earliest occupation at the site onwards (Early MPPNB), increasing proportionally through time (Rollefson 1992; von den Driesch in Horwitz *et al.* 1999, 71). In the eastern *badia*, the sheep and goats present by the PPNC/Early Late Neolithic are assumed to be domesticates introduced from the west (Garrard *et al.* 1996; Horwitz *et al.* 1999, 75). More precisely, Martin and Garrard (in Horowitz *et al.* 1999, 74) give the earliest date for the appearance of sheep/goat at Wadi Jilat, and by inference at Azraq Oasis, at 6830 cal. BC. The earliest date from Burqu' is from Phase 2 at Site 27000 (6230–5950 cal. BC), but, given the small samples recovered, this may be an accident of discovery and does not preclude the possibility that sheep and goat were being herded on the earlier sites around the lake.

Economic strategies

Given the wide variety of sites and differing economic strategies within the later PPN and the Late Neolithic of the *badia*, how should the evidence be understood? There may have been several discrete populations within the steppe who practised different forms of economic strategies. This possibility has been discussed by scholars such as Stordeur, for El Kowm (1993, 201 ff.), and Cropper, for eastern Jordan (2006; 2011). There are four principal permutations:

- many separate populations
- settled population
- seasonal pastoralism by settled population
- nomadic hunter-gathers
- nomadic hunter-herders
- three separate populations
- settled population
- seasonal pastoralism by settled population
- nomadic hunter-herders
- two separate populations
- settled population
- nomadic hunter-herders
- one single population
- settled population with seasonal pastoralism.

Many separate populations

This is a possibility. Stordeur (2000, 301 ff.) suggests that the evidence from El Kowm indicates that there are two quite discrete populations in the northern Palmyrene west of Jebel Bishri. She argues this on the basis of a number of contrasting behaviours. The inhabitants of El Kowm were living in well-built houses, while those living or, more properly, camping at Qdeir had no permanent architecture in the early phase of the site. Later, one or two isolated houses were built, and occupied only episodically. The lithic assemblages differed markedly in the time invested in the manufacture of tools: those at Qdeir were elaborately and carefully crafted, while those at El Kowm were made in a much more basic functional manner. Relationships with other sites indicated that for El Kowm these lay predominantly to the east, towards the settled villages of the Euphrates valley such as Bouqras and Tell as-Sawwan, Baghouz and, further, Um Dabaghiyah, while those for Qdeir lay to the west and south-west, into the steppe. The implication is that by the LPPN/LN two quite distinct populations were living in close proximity on the northern margins of the Badiyat al-Sham. One was a mobile population that herded flocks but also practised agriculture, and the other was a fully sedentary agricultural society.

Late Neolithic Dhuweila might, therefore, be seen to represent a relict hunter-gatherer population within the *harra* co-existing with the hunter-herders such as those using the 'burin sites' and also those occupying the sites around the Burqu' lake, whether or not they represent the same population. Stordeur (2000, 303) mentions the presence of 'nombreux sites de surface attestent de passages et de haltes plus épisodiques correspondent à des motifs sans doute variés: camps nomades, haltes de chasse, quête de matière première, cueillette.'¹ The 'haltes de

chasse' could represent similar relict hunter-gatherer groups, and Cauvin (1991) has identified the site of El Khabra, 5 km north of El Kowm, as a possible hunting camp. This argument provides for a settled population who only rarely moved into the steppe to gather specific resources on trips that were so short that they left no visible traces on the landscape (Stordeur 2000, 303), a nomadic or semi-nomadic hunter-herder population who also practised some agriculture, and a fully nomadic population that retained a hunter-gatherer way of life. Evidence for seasonal pastoralism by settled populations might be sought at Yarmoukian 'Ain Ghazal, where an element of semi-nomadic pastoralism may have existed (Rollefson 1992), although the evidence put forward for this has been questioned (Cropper 2006, 33–4). If such herding was practised, it is not known how deep within the steppe the 'Ain Ghazal herds may have been grazed.

Three separate populations

This is a possibility if the arguments put forward above are accepted but the notion of a relict hunter-gatherer population is dismissed and these sites assigned, rather, as specialized sites used by hunter-herder populations. The evidence for a relict hunter-gatherer population is not robust; while hunting camps do exist, they may well have been used on a short-term basis by hunter-herders, who, at Burqu' at least, derived more than 50% of their meat from wild sources. Late Neolithic Dhuweila is unusual and presents more of a problem, but even though sheep/goat represented less than 1% of the total faunal count they were nonetheless present (Martin in Betts *et al.* 1998, 159 ff). They might be explained as animals traded or raided from herding groups, but it is equally valid to suggest that the site represents a seasonal hunting camp used by some members of a herding community. Cauvin (1991, 52) stresses that the evidence from El Khabra need not be seen as indicating a society totally devoted to hunting, but rather that the site may represent a special activity location dedicated to hunting. The same could be said for Late Neolithic Dhuweila.

Two separate populations

This is a possibility if the notion of relict hunter-gatherers is dismissed, along with the idea that the 'Ain Ghazal populations practised any marked form of seasonal pastoralism. Cropper's (2006; 2011) work on Jordanian chipped stone assemblages has addressed this question in some detail. She demonstrates that while there are broad similarities in the reduction strategies and the tool assemblages of sites in both the Mediterranean region and the *badia*, there are also distinct differences, especially in core preparation. It is clear that different knapping methods were used in each region. This fundamental cultural trait would certainly not change simply because a population moved from the verdant to the steppic zones. This provides strong evidence to indicate that at least two separate populations existed. Both types of reduction strategy have their roots in a shared PPNB heritage, which provides the commonalities, but a separation seems to have occurred as hunter-gatherers moved out into the steppe in the late PPNB, as illustrated by Dhuweila 1.

One single population

It is much harder to argue a case for this situation. The work by Cropper in Jordan and Stordeur in Syria presents convincing cases for the existence of two distinct populations, one settled at the margins of the *badia* and one moving all over the *badia* from the edges of the fertile zones out across the deep steppe. The status of 'Ain Ghazal might be resolved by intensive survey work in the areas immediately east of Amman, testing lithic assemblages against Cropper's hypothesis and data from 'Ain Ghazal. Additional arguments have been put forward by Byrd (1992) and Martin (1999), supported by Betts (2008), to suggest, *contra* Köhler-Rollefson (1988; 1989a; 1989b; 1992), that the steppic population were not herders from villages such as 'Ain Ghazal, but indigenous hunter-gatherers who adopted pastoralism as a limited component of a multi-resource economy. Byrd argues for the PPNB expansion into the steppe as the result of pressure from the expanding village settlements in the fertile zones. He suggests that, once there, they responded to the problem of limited resources by diversifying and exploiting available food sources more intensively. Later they selectively integrated domesticated crops and animals into their subsistence base to supplement uncertain seasonal availability of wild resources with more predictable annual returns. Martin points out that the proportions of 20–50% sheep/goat in the faunal record on steppic sites equates neither with the fattening of flocks for slaughter at village sites nor total reliance on sheep/goat pastoralism by steppic populations. Instead the proportions of sheep/goat on sites in the *badia* are similar to those for wild animals such as gazelle or hare. Based on available evidence, the Late Neolithic steppic populations should be seen as generalist herders, hunters, foragers, trappers and occasional cultivators who entered the *badia* in the later PPNB predominantly as hunter-gatherers and extended their subsistence base pragmatically through time (Betts 2008).

Summary

Overall, in considering the evidence, perhaps the best case can be made for two distinct forms of economic strategy, one village-based with a permanent population growing crops and raising flocks that may have been herded short distances away from the settlements, the other largely nomadic, with an economy based on hunting, herding, foraging and other occasional activities. We should not talk of two populations, as clearly the people living in El Kowm were quite distinct from those living in 'Ain Ghazal. Similarly, we should perhaps not see the inhabitants of the steppe as a single unified group. It is quite likely that they represented distinct groups who may have had varying balances of economic strategies. There was an overlap between the two economic strategies at the margins of the steppe where they must have interacted, probably both positively and negatively. It may have been that the presence of a potentially predatory mobile population in the steppe restricted the distance to which the villagers herded their flocks away from their houses.

The introduction of sheep/goat herding into the *badia*

Like the question of the origins of agriculture, the processes behind the development of pastoralism are not simple to establish. There is an overlying pattern of extended growth of large villages during the PPNB and evidence for the

collapse of these, possibly owing to habitat decline and resource depletion. These changes must have been in part due to human activity, but may have been linked to climatic changes as well. Environmental evidence is varied. Recent studies from Soreq Cave in Israel (Bar-Matthews *et al.* 1999; 2000) have suggested that, while overall from c. 17,000 to 7000 cal. BP there is evidence for increased temperature and annual rainfall, there is also evidence for a specific 'deluge period', during which annual precipitation was extremely high, that can be dated between approximately 8500 and 7000 cal. BP, the period from the end of the PPNC into the Early Chalcolithic. This humid phase was apparently interrupted by a period of aridity between 8200 and 8000 cal. BP, when there was a sudden cooling combined with a decrease in rainfall (Bar-Matthews *et al.* 1999, 91). Other researchers (e.g. Sanlaville 2000, 179, fig. 72) suggest that the PPNC period – that is, the steppic Early Late Neolithic (Martin 1999, 89–90) – coincided with a short period of increased aridity. The 'aridity' theory might help to explain the demise of the congested PPNB settlements but may perhaps disguise other, more human, causes. The 'deluge' theory explains much better the rapid expansion of human activity in the dry steppe, including the introduction of domesticated animals with specific needs for adequate water and grazing.

Some village populations, such as that of 'Ain Ghazal, saw continued, if reduced, occupation in the Late Neolithic. In other cases, the population may have moved elsewhere, as has been suggested for Beidha and other sites in the Petra area, where Gebel (1992) has postulated a relocation from the sandstone shelf eastward to the edge of the steppe and sites such as Basta. There is also an expansion into the steppe in the Late PPNB, into both the eastern *badia* and the Negev and Sinai (Goring-Morris 1993; Rosen 2008). In Jordan this expansion is specifically linked with hunting, typified by Stage 1 at Dhuweila, while in southern Israel and the Sinai peninsula sites such as Nahal Issaron (Goring-Morris and Gopher 1983) appear to represent a mixed economic base, possibly including the herding of goats. Goring-Morris suggests, however, that, as in the Badiyah al-Sham, it was in the 6th millennium BC that the herding of goats became a significant component of the subsistence base (Goring-Morris 1993, 85; see also Horwitz *et al.* 1999; Rosen *et al.* 2005).

Thus, the available evidence indicates that, from the PPNC/LN transition, there was a hunter-forager-herder population in most of the marginal steppic zones of the Levant (Garrard *et al.* 1996). Herding and hunter-gatherer lifestyles require contrasting choices in terms of site location and movement. Adapting to a subsistence strategy that could accommodate the main priorities of both within a marginal environment where choices are strictly limited must have been a delicate balancing act. Cribb (1991) has outlined some of the broad distinctions between hunter-gatherers and nomadic pastoralists (for qualifications see also Wendrich and Barnard 2008, 6). The Late Neolithic sites of the *badia* appear to represent an intermediate stage in the change from one to the other, and it may be helpful to examine them in respect to his criteria. Hunter-gatherers are primarily concerned with procurement. Their movements are governed by the search for resources for their own consumption and are driven by a need to acquire a wide variety of foods and materials. They tend to follow stable and localized migratory patterns as the availability of their key resources is relatively predictable. In considering risk they are concerned for their own survival. Pastoralists, on the other hand, concentrate

on production. They move according to the needs of their flocks rather than themselves and their movements are governed primarily by the need to maintain access to two essential resources, water and grazing. Their migrations are characterized by instability and dramatic shifts in annual patterns of movement as the availability of their key resources is largely dependent on the vagaries of storm patterns. Their risk assessment is based on threats to their herds rather than to themselves.

In considering these parameters it is evident that, in contrast to PPNB sites in the *harra*, access to water and grazing was a much greater priority in the Late Neolithic. Site distribution is also much more widespread, extending all across the *hamad*, perhaps implying changing annual patterns of movement according to the availability of grazing. Yet there is still evidence for specialized resource procurement, as can be seen in the Late Neolithic hunting camp at Dhuweila (Betts *et al.* 1998) and the Late Neolithic knapping sites found along the western margins of the *hamad* (see Chapter 6). The evidence suggests a strong case for a transitional subsistence strategy where traditional resource bases such as gazelle culling support the introduction of a new strategy to which hunter-foragers must adapt gradually.

Rosen (2008, 119 ff.) has looked in detail at parallel developments in the Negev and Sinai where similar transitional economies have been identified. However, while the two regions share similar marginal environmental conditions, they differ with respect to their proximity to areas with rapidly evolving sedentary societies. The Sinai and Negev regions are also rich in mineral resources (Betts 2008, 37 ff.).

In the Sinai and Negev sheep and goat appear in the Late Neolithic in small numbers on hunter-gatherer sites, creating a hunter-herder-forager economy as in the *badia*. Rosen suggests that by the later Neolithic there is evidence for increasing site sizes, implying the seasonal aggregation of multiple bands, something for which there is no apparent evidence in the *badia*. Rosen cites the use of 'desert kites' as an example of this, but their floruit in the *badia* apparently began in the late PPNB. The evidence from the tiny hunting camp of Dhuweila, which is linked to the use of the 'kites', does not provide convincing proof for band aggregation. More convincing is the shift from clustered room architecture to corral with attached room which occurs in both the Sinai/Negev region and the *badia* around the Late Neolithic to Chalcolithic periods. This can be seen as a change to a lifestyle prioritizing pastoral values. It recalls Cribb's key distinctions, showing a further and fairly fundamental shift towards choices favouring herding over foraging and hunting. The next important change in the Sinai/Negev, the rise of economic relationships between the 'Desert and the Sown', can be seen in the Early Bronze Age, with a massive increase in the numbers of sites and evidence for trade in copper, and other minerals to a lesser degree. This floruit cannot be identified in the *badia*, where there are few mineral resources.

The *badia* populations did have a significant strategic advantage: command of the shortcut from the Levant to Mesopotamia and the Middle Euphrates. This was of little value in the Neolithic, but as the urban civilizations of the Tigris and Euphrates valleys began to look abroad for trade goods, opportunities must have begun to arise. This is documented historically only in the rise of camel pastoralism by the 1st millennium BC, which was almost certainly driven by trading possibilities, but it is likely that earlier donkey caravans traversed some

part of the region, leaving as yet no identifiable archaeological traces. The unlikely discovery at Dhuweila of cotton fibres dated around the Chalcolithic/Early Bronze Age adhering to plaster, probably used as a sealing for a vessel, may hint at exactly this (Betts *et al.* 1994; 1998 *et al.* 140–2). An isolated find near Jebel Qattafi of an envelope ledge handled jar probably of Levantine EBIII form (Betts 1984) may be another example of Bronze Age travellers in the region.

Studying the material evidence for changes in the types and locations of sites can provide some insight into the economic shifts that were taking place in the *badia* in the Late Neolithic/Chalcolithic periods, but it may also be helpful to consider the nature of animal management at this time and how this may have been impacted by the need to pursue two contrasting forms of subsistence strategy. There are constant warnings in the scholarly literature against excessive use of modern or historical ethnographic parallels to interpret the prehistoric past. However, a strongly dominant image of the Middle East is that of the shepherd tending his or her flock of sheep and goats, and it is possible that many scholars, when considering pastoralism, unthinkingly presume this to be the only possible means of managing domestic herds.

Close herding is by no means the only method to control livestock. The type of management depends on the products to be obtained from the animals, the time and labour constraints placed on the owners and the environmental conditions in which the animals are kept. A few examples may illustrate this variety. In Scotland, sheep bred for meat and wool may be left to run loose in wild mountain country for much of the year. They are gathered in once or twice a year at lambing and for shearing. They tend to stay broadly within one large territory, but are generally marked so that if some animals stray onto another farmer's land they will be caught at the gathering and returned to their owners. Normally only a few animals will stray in any one year. In the roughest country the gathering is carried out by men on foot with dogs (personal observation). In Calabria, in southern Italy, there is intensive agriculture in the lowlands and coastal plain, principally olive, citrus and small garden plots of vegetables. Sheep and goats are kept on the marginal land of the Aspromonte range which is high, steep and heavily wooded. The sheep are herded separately from the goats and are more closely tended, while the goats are left loose on the mountain. When the goats are needed, for example to obtain an animal for slaughter, rather than trying to gather them in on the rocky, heavily wooded slopes, the shepherds will leave the gate to their pen open with some food inside. They will return to the pen within a few days. The sheep are milked for three months during lambing, primarily for the production of cheese, and the male lambs are slaughtered at Easter. Goats are favoured for meat as mutton is considered strong-smelling and unpleasant (pers. comm. Rocco Oppido; Gianni Taurianovese; Nicola Gazzana). In the Tianshan in western China the local Kazakh nomads herd horses, cattle, sheep and goats. They practise transhumance, moving from the low-lying oases where they winter up to high summer pastures in the open grasslands below the treeline. Again, the sheep are more close-herded but the goats may be left loose on the mountain in the woods for several months and gathered in when necessary (pers. comm. anonymous informants). A survey of herding practices throughout the world would reveal an even wider variety of herding practices, depending on environmental conditions and the subsistence strategies of the local herders. A key point, however, is that

animals can be left loose in open country for long periods of time and then brought in for close herding as required. There is a risk of loss to predators, a risk that still exists in both southern Italy and western China. Even in Scotland, new-born lambs are at risk from crows. However, this risk is generally offset by the energy savings of free-range management.

Given that the sheep and goat herded by the Neolithic populations in the *badia* would be genetically closer to their wild ancestors than to modern breeds, they should have been able to adapt easily to a free-ranging existence. The presence of water would have kept them within a limited range. There is still debate over whether the first domesticates were kept solely for meat or exploited also for secondary products such as milk and wool. Animals exploited for milk would require close herding for the months of the year around lambing time. This would also assist in protecting the vulnerable young in the first few months of their lives. Free-range management might be a suitable option for the remaining months of the year, enabling the group to place greater emphasis on exploiting other resources. If the animals in these initial stages of herding in the steppe were exploited primarily for meat, then establishing a small herd in the vicinity of the major rainpools would be advantageous. When the group returned to the water source they could either hunt or herd their flocks as required. A hypothesis for animal management in the Burqu' area is that the local population may have let their herds run wild around the lake for at least part of the year, freeing them up to travel long distances in search of other necessary resources. They need not have been constantly encumbered by the necessity of driving their herds with them wherever they went. Since the flocks were not their sole means of survival, a higher degree of risk was acceptable. The limitations on sheep and goat in the *badia* have been discussed in detail by Lancaster and Lancaster (1991). It is clear from this that herds could have survived in the wild only in a very small number of areas where an annual supply of water was associated with adequate grazing. Burqu' is one of the few such locations, and qa' al-Wisad, further to the south, may be another; this may account for the high concentration of Neolithic sites to be found in both places. Unfortunately, the Burqu' faunal data is too limited to offer useful evidence towards the question of whether the animals were exploited for milk as well as meat. The gradual shift towards the use of corrals in the late LN/Chalcolithic may indicate a move towards close herding as the reliance on domestic animals over hunting and foraging became greater. It may also reflect the gradual introduction of milking.

The *badia* through the ages

For a great deal of the history of human occupation in the *badia*, it has been a place of freedom and refuge. It has always been a choice to live in the *badia* and not an imposition; it has never been a place of exile. Freedom may also mean on the fringes of, or beyond, state control. The second Gulf War has highlighted this aspect of the region; even close monitoring from space cannot fully police the permeable international borders that cross it. Yet the *badia* is not a lawless region. Throughout recorded history it has had its own laws, even if they were not those of the states that nominally controlled parts of it. Its economy in historical times has been a blend of pastoralism and trade, both legitimate and otherwise. Scattered among those engaged in such activities was a thin sprinkling of people

involved in what might be termed service industries; in modern times the vehicle mechanics and small shopkeepers in the highway road stations, and the cheese-makers working among the flocks in springtime. Over longer time spans there were itinerant craftspeople and specialized nomadic groups such as Gypsies and the Solubba. The harshness of the environment has severely restricted the number of permanent or semi-permanent structures and settlements. Life in the region consists very largely of short-term settlement and high levels of movement. The *badia* is capable of supporting permanent human occupation, but almost always with some communication to the fertile lands surrounding it. Even as early as the Epi-Palaeolithic, trade in luxury items such as ornamental stones augmented the austere conditions of life in the steppe. This contact is not mandatory, but without it life would be lived at a very basic level indeed. For the later prehistoric periods, archaeological evidence shows that the *harra* and the western *hamad* were the first to be used extensively, from the Epi-Palaeolithic onwards. The eastern *hamad* does not seem to have seen extensive use prior to the Late Neolithic expansion. From then on, although the evidence is scanty, it is most likely that much of the *badia* was always in use from time to time, depending on annual patterns of precipitation.

NOTE

Numerous surface sites attesting to journeys and episodic halts corresponding to undoubtedly varied activities: nomad camps, hunting stations, prospection for raw materials, gathering of wild resources.

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Index

- Abu Qatada 17
Abu Masiad 6
Abu Rujum 5
Aged 176
Ahl al-Bayt 159, 165, 166, 167, 168, 173, 176, 177, pl. 16, pl. 17, pl. 18, pl. 19, pl. 20, pl. 21, pl. 22
Ain al-Assad 4
Ain Ghazal 157, 60, 179, 184, 185, 186, 187, 188
al-Aijun 159
al-Azraq xv, 3, 4, 5, 31, 177, 185
al-Ghayyath 173
al-Gharqa 151
al-Ja'f 158, 185
al-Wilayyan 156
ar-Ribbi 157, 158, 176, 177
ar-Ribbi Anwar 157
ar-Rudayshdat 156
Badi'at al-Sam 175, 186, 187
Baghuz 106, 186
Ba'ja 57, 60
Balik 98, 107
Bast 57, 60, 188
Bayi 6, 142, 163, 185
bayt al-Sha'ar 173
Beid 188
Bir al-Ghusain 16
Birk 163
Bouq 187
Burqa 2, 4, 5, 6, 7, 8, 9, 10, 11, 17, 23, 24, 25, 52, 53, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 137, 138, 139, 140, 141, 142, 147, 149, 151, 152, 155, 156, 157, 158, 167, 168, 171, 173, 174, 176, 177, 180, 181, 183, 184, 185, 186, 187, 190, pl. 1, pl. 3, pl. 4, pl. 10
campsite 32, 115, 143, 158, 160, 164, 165, 168, 169, 170, 171, 172, 173, 174, 175, 181, 183, 186, pl. 30

Dhuwala 1, 60, 67, 68, 71, 73, 75, 80, 87, 92, 93, 100, 107, 117, 124, 127, 130, 167, 179, 180, 181, 182, 184, 185, 186, 187, 188, 189
drystone 67, 88, 100, 102, 129, 176, 181, 185
Dummal 63, 173
El Khadra 187
el-Kowayn 185, 186
floodplain 156, 162, 164, 174
Frejja 173
ghadames 156, 158, 159, 160, 162, 163
ghudra 167, 181
hamadi, xv, 1, 2, 5, 6, 7, 9, 10, 61, 80, 134, 138, 142, 144, 155, 156, 157, 165, 167, 168, 173, 175, 183, 185, 186, 189, 190, 191, pl. 17, pl. 21, pl. 29
harraa, iii, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 13, 14, 23, 25, 26, 29, 31, 35, 40, 43, 53, 60, 117, 129, 138, 143, 155, 156, 165, 167, 168, 173, 175, 179, 180, 181, 183, 184, 185, 186, 187, 189, 190, 191, pl. 16, pl. 22
Hauran 155, 156, 185
Hazihi 181
hillslope 31, 35, 144, 147
hilltop 7, 157, 159, 160, 165, 176, 177, 180
hisar al-iblis
Hismak 185
Howzat 173
Ibn al-Qayyim 187
Jauf 157
Jawf, 151, 155
Jebel al-Bu Thawwab 185
Jebel al-Jill 155
Jebel al-Naba 156
Jebel al-Rishat 157
Jebel al-Shri 187
Jebekir 152, 155, 156
Jebel al-Thum 165
Jebel al-Najaf 8, 9, 10, 13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 29, 30, 31, 32, 40, 61, 62, 63, 73, 75, 76, 88, 89, 91, 92, 104, 117, 124, 127, 139, 140, 141, 163, 180, 181, 182, 184, 186
Jebel al-Qurayn 32, 33, 34
Jebekir 14Wual
Jebel al-Uwienid 157
Jezira, 173
Jibala, 42, 44, 45
Judaia 155 Basin
Khabra 165 Abu Hussein
Khabra 157 al-Manaji
Khabra 165 as-Samrin
Khabra 158 Um Sahaliya
Khalat 'Anaza
Kharafneh
Mafray, 4, 6
mahad 156, 167
Mahad al-Shahami 157
Mahad al-Hadid 135, 136, 137, 138, 139, 140, 141, 142, 158, 186
mihra 155, 176, 177
Nafud desert
Nahla 123, 186

Palm164, 185
 Palmfyrène oasis
 Qa' A165 Hussein
 Qa' A101165a180, 181, 186
 Qa' A11165d
 Qa' B11165h80
 Qa' Mejalla
 Qa' M1165a32, 35, 37, 38, 39
 Qa' S1165a43, 44, 45, 47, 48, 49
 Qasr1165c, 171, 173, pl. 1
 Qattaf1165lls
 Qdei1165, 184, 185, 186, 187
 qi'an175, 181
 rock1165a144, 147, 152, 153, 155, 160, pl. 15, pl. 28
 Ruhl1165a, 156
 Rujm168-Dumeithat
 Rutba184
 Ruw1165h156, 160, 162
 Ruw1165h168Qisb
 Ruw1165h164Satih
 Rwa1165a, 167, 168, 173, 177
 Rwey1173
 shail11, 35, 175
 Sham1173a
 Shar1173a
 Sirhan142
 Solub1165, 173, 190
 spear1165a146
 Tell1165h117, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 165, 183,
 184, 185, pl. 15
 Tell1165aawwan
 Tell1165Tan al-Gharbi
 Tell1165aLula
 Tell1165aLilAbyad
 Tell1165aLilR55a
 Tulul1165aAshaqif
 Um1165aBagh1165a187
 Umm1165aTlel
 Umm1165aFeshrat
 Wadi1165aAtheyna
 Wadi1165aSabah
 Wad1165aDabba
 Wad1165aDhobai
 Wadi1165aTaxi
 Wadi1165aSa
 Wadi1165aLil185
 WadB1165a6, 26, 29, 30, 31, 57, 60, 67, 68, 169, 170, 172, 179, 180, 184, 185, 186
 Wadi1165aGat
 Wadi1165aQat1165a35, 40, 46, 60
 Wad1165aRajil32
 Wadi1165aLil1165a159, 160, 173
 Wadi1165aLil
 WadB1165aLil
 Wadi1165aHu'eib

Wad5Sira12n173

Wadi100rafi

wasn167, 175, 176, 177

wusi160, 176, 177

Wud52n156

Zum18 'Arus



Plate 1. Qasr Burqu'.



Plate 2. The expedition camp.



Plate 3. Beduin collecting water at the Burqu' lake.



Plate 4. The Burqu' ruin field, showing the Qasr (left) and prehistoric sites (right).



Plate 5. Pre-modern corrals above the western shore of the lake.



Plate 6. Detail of walls at Site 03000 after excavation.



Plate 7. Site 27000 after initial clearing of rubble.



Plate 8. Site 11000 after excavation.



Plate 9. Site 28000 after excavation.



Plate 10. Recent graves at Burqu'.



Plate 11. Mahfour al-Ruweishid before excavation.



Plate 12. Mahfour al-Ruweishid: corral wall during excavation.



Plate 13. Mahfour al-Ruweishid: interior after excavation showing corral wall and pavement.



Plate 14. Mahfour al-Ruweishid: hearth on bedrock.



Plate 15. Tell al-Hibr: entrance to rock shelter.



Plate 16. Ahl al-Jebel grave in the harra.



Plate 17. Ahl al-Jebel grave in the hamad.



Plate 18. Ahl al-Jebel grave, showing items left on grave.



Plate 19. Hollow stone near Ahl al-Jebel grave with coffee grounds and crushed cardamom.

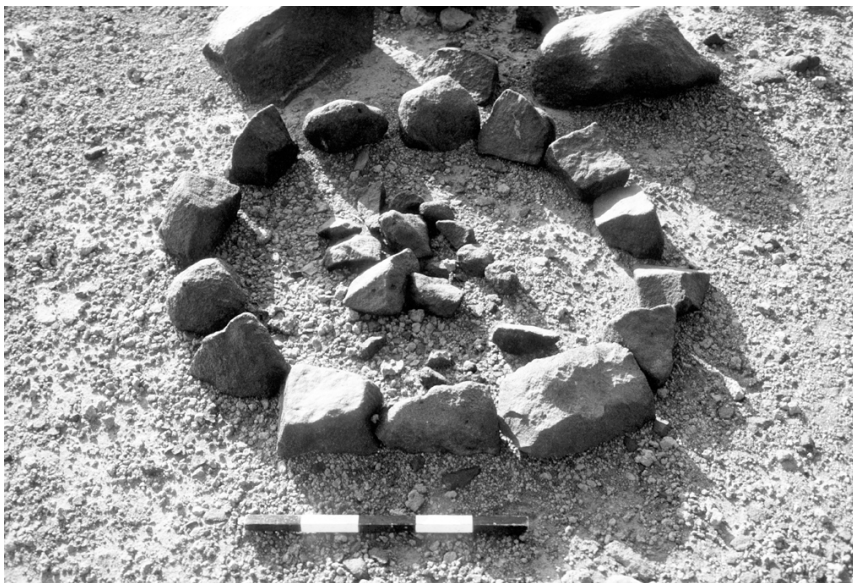


Plate 20. Stone 'coffee hearth' near Ahl al-Jebel grave.



Plate 21. Ahl al-Jebel grave in the hamad: platform for laying out the body.

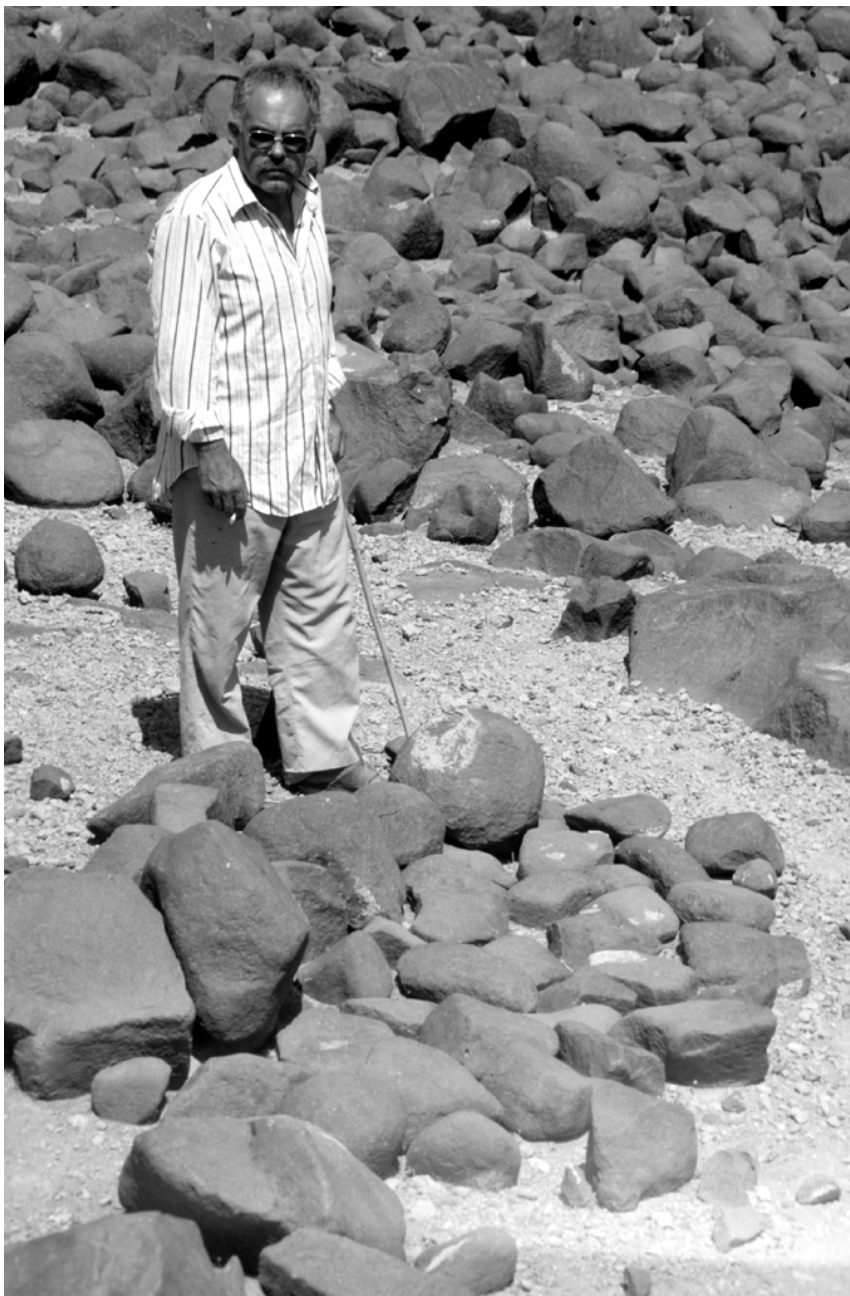


Plate 22. Ahl al-Jebel grave in the harra: platform for laying out the body.



Plate 23. Toy tent.



Plate 24. Desert mosque.



Plate 25. Desert mosque.

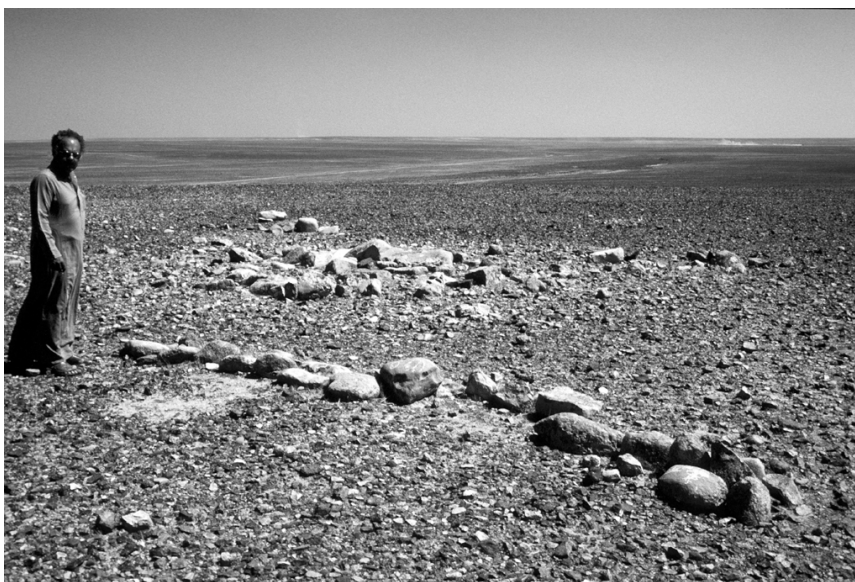


Plate 26. Desert mosque.

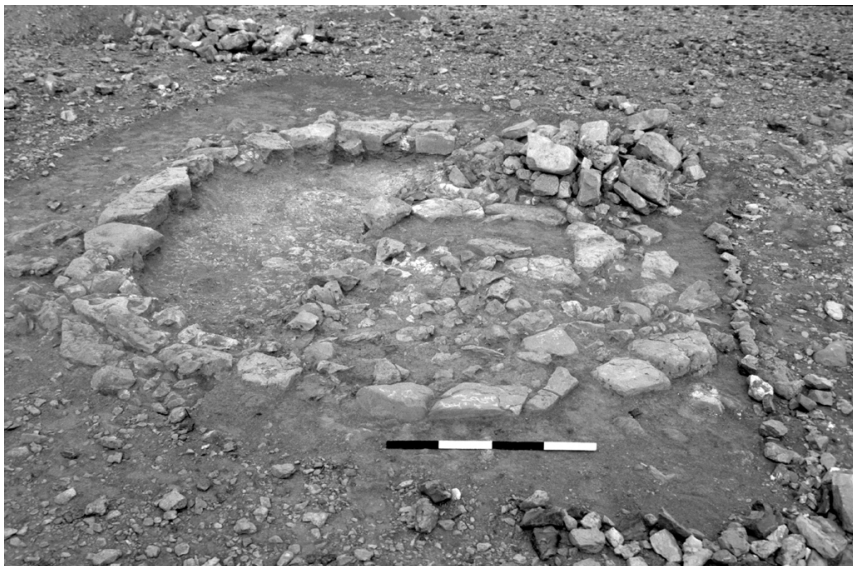


Plate 27. RQ 1000 stone burial cairn.



Plate 28. RQ: partially blocked rock shelter in cliff.

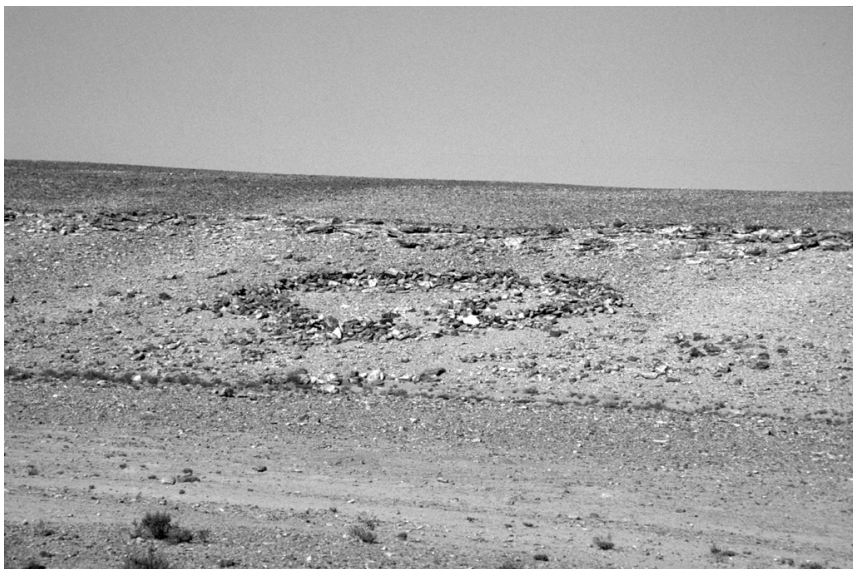


Plate 29. Early stone corral in the hamad.



Plate 30. RQ: collection of material from recently abandoned camp sites.